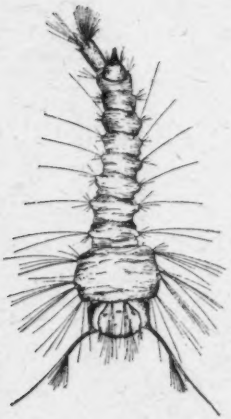
MARCH, 1909.

ENTOMOLOGICAL NEWS

Vol. XX. No. 3.



Larva of Culex perturbans as described by Dr. John B. Smith.

EDITOR:
HENRY SKINNER, M. D.
PHILIP P. CALVERT, Ph.D., Associate Editor.

ADVISORY COMMITTEE:

EZRA T. CRESSON.	HENRY L. VIERECK.	J. A. G. REHN.
PHILIP LAURENT.	WILLIAM J. FOX.	H. W. WENZEL.

PHILADELPHIA:
ENTOMOLOGICAL ROOMS OF
THE ACADEMY OF NATURAL SCIENCES,
LOGAN SQUARE.

Entered at the Philadelphia Post-Office as Second-Class Matter.

ENTOMOLOGICAL NEWS

Published monthly, **excepting August and September,** in charge of the Entomological Section of the Academy of Natural Sciences, Philadelphia, and the American Entomological Society.

ANNUAL SUBSCRIPTION, $1.00 IN ADVANCE.

Outside of the United States and Canada, $1.20.

SINGLE COPIES 15 CENTS

Advertising Rates: 30 cents per square inch, single insertion; a liberal discount on longer insertions. No advertisement taken for less than 60 cents—Cash in advance.

☞ All remittances should be addressed to ENTOMOLOGICAL NEWS, Academy of Natural Sciences, 19th and Race Streets, Philadelphia, Pa.

The Celebrated Original Dust and Pest-Proof

METAL CASES

FOR SCHMITT BOXES

Described in "ENTOMOLOGICAL NEWS," page 177, Vol. XV

MANUFACTURED AND FOR SALE BY

BROCK BROS., Harvard Square, Cambridge, Mass.

I COLLECT IN ALL ORDERS FOR

CASH

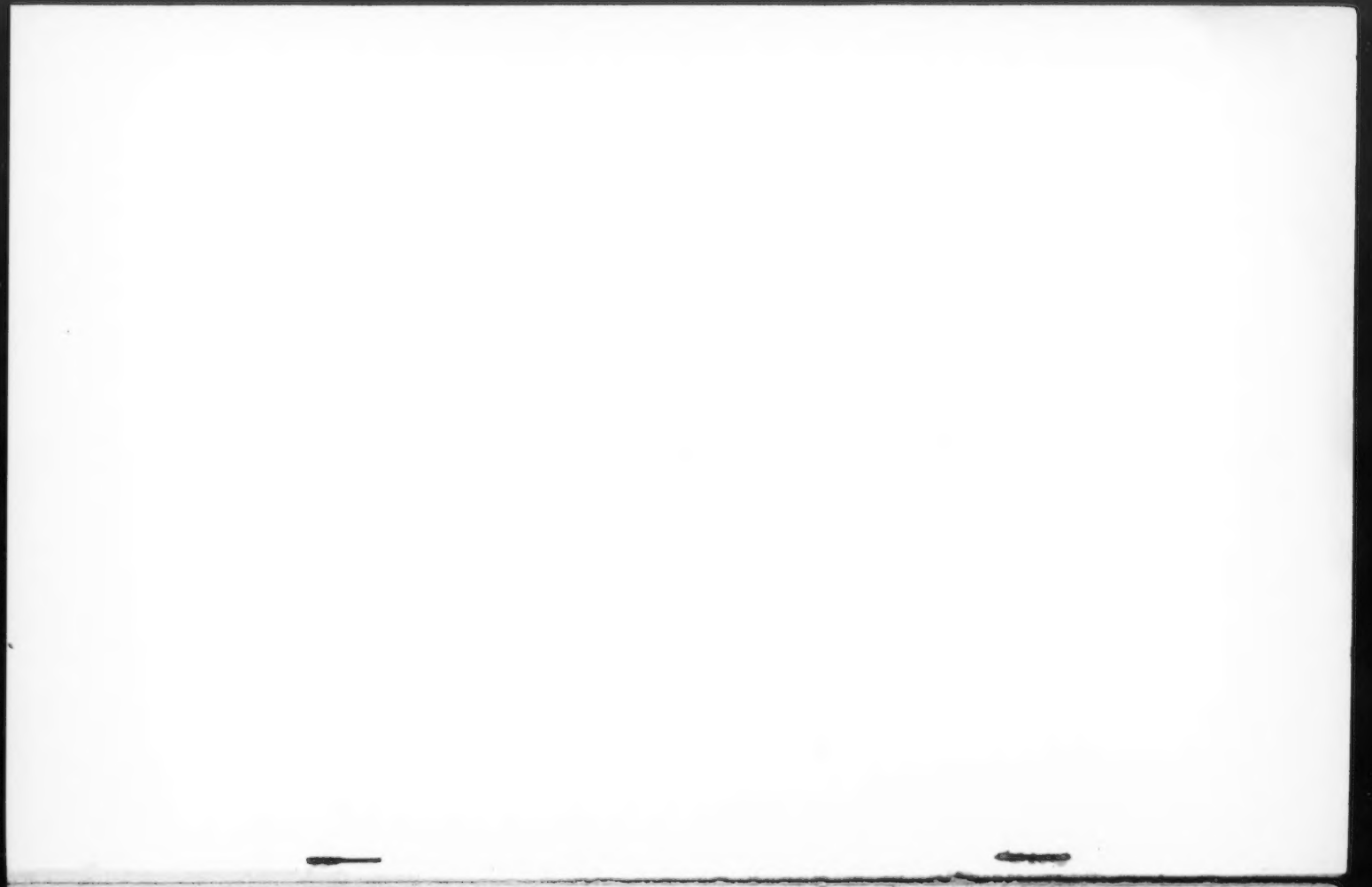
Price lists Coleoptera, Hemiptera, Hymenoptera for 2 cent stamp.
Positively no exchange.

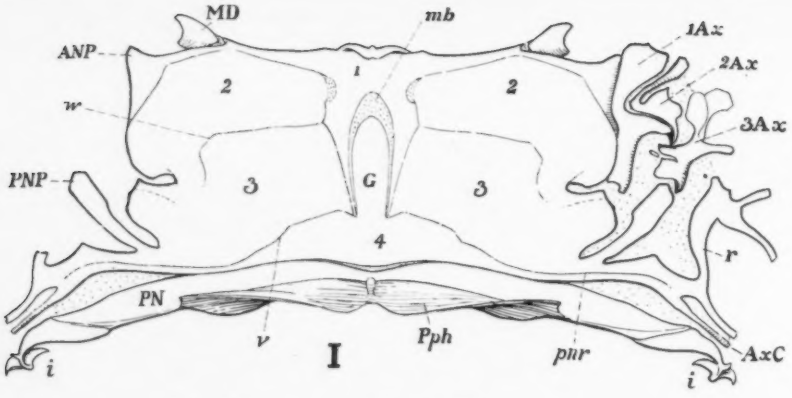
A. H. MANEE, Southern Pines, North Carolina

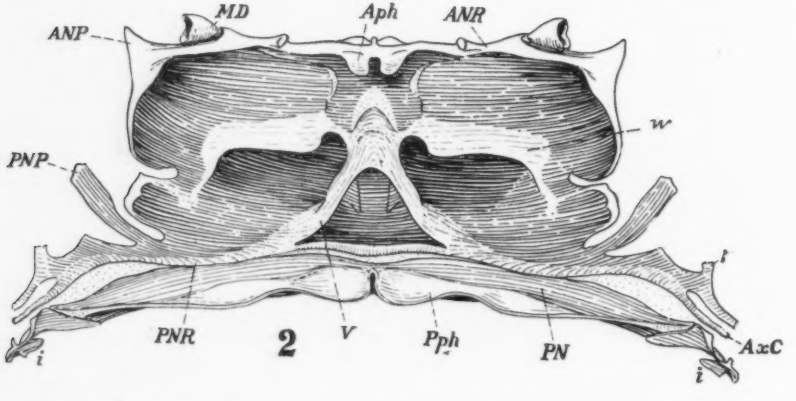
North American Cicindelidae For Sale

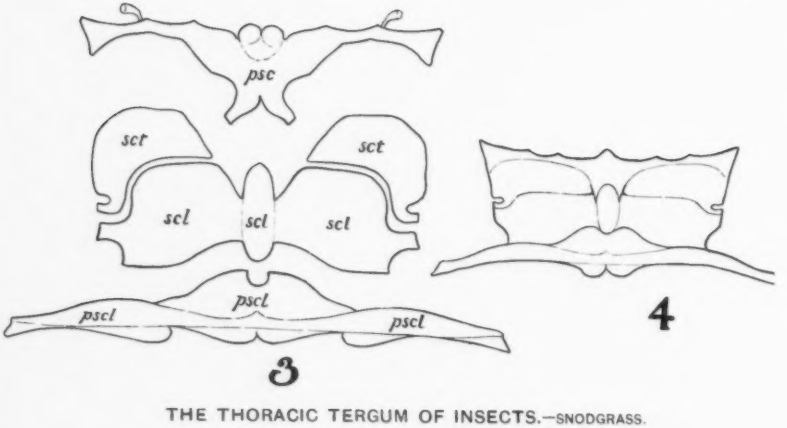
Amblychila cylindriformis Say, *40c.; baroni* Riv., *$4.; Cicindela vulturina* Lec., *40c.; Santaclarae* Bates, *40c.; scutellaris* Say, *8c.; nigrocoerulae* Lec., *20c.; hornii* Scha., *50c.; pimeriana* Lec., *25c.; formosa* Say, *20c.; fulgida* Say, *8c.; knausii* Leng, *15c.; arizonensis* Bat., *25c.; circumpicta* Laf., *15c.; lemniscata* Lec., *15c.; togata* Laf., *15c.; var. apicalis* W. Horn, *15c.; pamphila* Lec., *15c.; var. 16-punctata* Klug., *10c.*

THE SNOW COLLECTIONS, University of Kansas, Lawrence.









THE THORACIC TERGUM OF INSECTS.—SNODGRASS.

ENTOMOLOGICAL NEWS

AND

PROCEEDINGS OF THE ENTOMOLOGICAL SECTION

ACADEMY OF NATURAL SCIENCES, PHILADELPHIA.

VOL. XX. MARCH, 1909. No. 3.

CONTENTS:

Snodgrass—The Thoracic Tergum of Insects..... 97
Rehn—The New Jersey Records of Hesperotettix brevipennis (Thom.) 104
Coquillett—Rediscovery of the Bibionid genus Eupeitenus..... 106
Fox—A new species of Ceratophyllus.. 107
Ainslee—The Manner of Attachment of Parasitized Aphids 110
Barth—An Artificial Ant's Nest..... 113
Hebard—A few notes on December So. Georgia Orthoptera..... 115
Herrick—Notes on Contarinia sorghicola 116
Gillette—Two little-known Aphids on Carex sp..... 119
Lovell—The Bees of Massachusetts: Osmia and Sphecodes 122
Viereck—A new species of Andrena... 126
Rowley-Another season with Catocalae 127
Editorial..... 136
Notes and News..... 137
Doings of Societies..... 139

The Thoracic Tergum of Insects.

By R. E. SNODGRASS.

(Pl. VI.)

The idea that the hexapod thoracic tergum consists normally of four transverse plates is now unfortunately a dogma of insect morphology. Nearly all entomologists since Audouin (1824) have construed the facts in some way so as to make the thoracic terga of any particular insect conform with this supposed general quadruple structure. Though a few authors have expressed the opinion that a thorough study of the insect thorax would not bear out this conception, yet Audouin's drawings of the back of *Dytiscus circumflexus* have been copied over and over again to illustrate the general structure of the insect tergum. Two authors during the past century—Chabrier (1820) and Straus-Dürckheim (1828)—have been contented with describing the back plates just as they exist.

The object of the present writer is not to discredit Audouin, but to discredit the notion that the back of an insect segment is composed of four variously modified primitive transverse elements. This notion is fast growing into the still more erroneous one that the entire segment is a compound of four metameres. It is true that the great advancements of any science

have been due to great conceptions of generalization, and history furnishes many examples where such ideas have arisen from inaccurate observations or have caused their author to see the facts in a distorted manner. So Audouin did a great thing for entomology when he published, in 1824, his generalizations on the insect thorax, though in establishing his theory he erroneously described the facts in some cases. It is really fortunate that no entomologist at that time made a critical examination of his data for the whole idea of reduplication of parts in the successive segments might have been then discredited. Yet it is remarkable that no one at the present time has pointed out how palpably inaccurate are Audouin's drawings of the meso and metatergum of *Dytiscus circumflexus* Fab. on which he bases his generalizations on the tergal structure.

Figure 1, Plate VI., is a drawing of the metatergum of *D. circumflexus*. On the right are shown the axillary sclerites (1 *Ax*, 2 *Ax*, 3 *Ax*) by means of which the wing is articulated to the metathorax. The dotted parts represent membrane. Now, it is perfectly clear that this tergum consists of only two actually separate plates, but these two are clearly and distinctly separated by a definite suture which is widely membranous toward the sides and narrowly so in the middle. The anterior plate bears the wings entirely, its posterior angles being produced into the *axillary cords* (*AxC*) or corrugated cord-like thickenings of the anal margins of the basal or axillary membranes of the wings. The second or posterior plate (*PN*) is comparatively narrow. It is entirely free from the wings, bears the *postphragma* (*Pph*) of the metathorax on its posterior margin, and laterally articulates with the epimera of the metathorax by special processes (*i*).

The metatergum of *Dytiscus* is, thus, composed actually of only two plates—one bearing the wings, the other free from the wings and connected with the epimera behind the wing bases. This structure is, moreover, characteristic of the metaterga of all adult Coleoptera and Euplexoptera and of both the meso and metaterga of all the other insect orders except the Aptera and the Orthoptera. The second plate is lacking in all nymphal forms and in the pupae of the lower Holometamor-

phic orders such as the Neuroptera and Coleoptera. The wing-bearing tergum of an adult Orthopteran is simply that of the nymph plus a sclerite developed behind the former. That is, the nymphal notum, from the entire lateral margins of which the wings are developed, becomes the wing-bearing plate of the adult tergum, but, in all the principal winged orders except the Orthoptera, a second tergal plate is developed in the adult behind the wing-bearing plate. This second plate is highly developed in the Lepidoptera, Hymenoptera and Diptera, especially in the mesothorax where it bears the large phragma that shuts off the cavity of the thorax from that of the abdomen. Sometimes it is reduced and hidden between, or even within, the segments. It is never present in the prothorax.

The words "tergum" and "notum" are commonly used interchangeably to denote all the dorsal sclerites of any segment. Audouin (1824) established this use of the word "tergum," while Burnmeister (1832) and Newport (1839) used "notum" in the same sense. Since, now, it is obvious that we need *one* term to signify the entire dorsal chitinization of a segment and *two others* to designate the individual plates, the writer proposes to retain the name *tergum* as the general term applying to all the chitinous parts of the dorsum of any segment, and to limit the word *notum* in its application to the anterior or wing-bearing plate. The two terms used in this manner are, hence, still interchangeable in all cases except in the wing-bearing segments of most adult insects where the tergum acquires the secondary posterior sclerite. This latter may be called, on account of its position, the *postnotum*, or from the fact that it is not a primitive tergal plate, the *pseudonotum*.

The second term has already been given to it in the Euplexoptera (Dermaptera) by Verhoeff (1903) and adopted in a former paper on the insect thorax by the author (1908), though Verhoeff may not have intended the general application of the word in this sense. The second tergal plate or pseudonotum is the one usually called "postscutellum." It is a part of the *postscutellum* of Audouin (1824), and is the *cloison costale* or *costal* of Chabrier (1820), the *postfroenum* of Kirby and Spence (1826), the *tergum* of Straus-Dürckheim (1828), the

subpostdorsum (including the phragma) of Amans (1885), the *metaphragma* (including the pseudonotum and true phragma) of Kolbe (1889), and the *acrotergite* of the following segment, in most cases, of Berlese (1906).

The metanotum of *Dytiscus* is a complicated plate and is subdivided by distinct lines into six regions (figs. 1, 1, 2, 2, 3, 3, 4). Two of the subsclerites (1 and 4) form the anterior and posterior regions of the notum respectively. Each is widened mesially. The former sends posteriorly two arms which interlock with an anterior median tongue of the latter forming the floor of the median notal groove (*G*). The other subsclerites (2, 2, 3, 3), as will be seen from the drawing, are paired and together occupy the greater part of the notum.

An examination of the ventral surface of the tergum (fig. 2) reveals the fact that all of the lines appearing on the surface of the notum, except those defining the anterior subsclerite are simply the external marks of internal ridges (*w* and *B*). In addition to these are the anterior and posterior marginal ridges of the notum (*ANR* and *PNR*). The ridge *w* is peculiar to the Coleoptera, the other three are common to nearly all insects.

Hence, it must certainly be evident to anyone who will verify these drawings by a study of any species of *Dytiscus* that four transverse tergal plates do not actually exist, and that only the imagination of a person intent upon establishing such a generalization could make any such construction out of the facts.

If, now, we examine Audouin's drawings (figs. 3, 4) of the metatergum of *Dytiscus circumflexus*, we are forced to admit that he made separations where he wanted them regardless of the true anatomical structure and combined other parts that are in nature distinct. Figures 3 and 4 are enlarged copies of Audouin's drawings. His first division, the *prescutum* (*psc*), is correct in a general way. The second, the *scutum* (*sct*), is likewise, disregarding details of shape. Here, it will be seen, Audouin's typical example of the scutum has this plate divided into two halves by a posterior extension of the prescutum. It is when we come to the next division, the *scutellum* (*scl*),

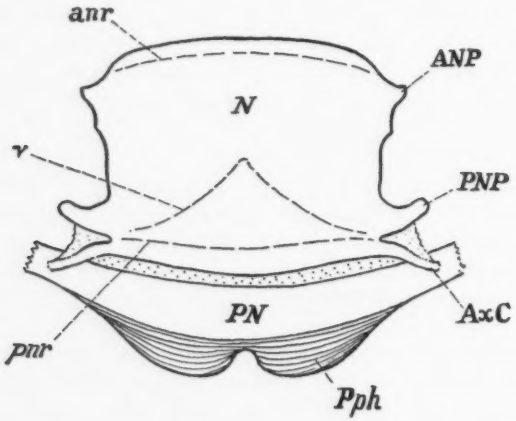
that the artificialness of this scheme appears. On the specimen it is clear that the median tongue on the floor of the groove (fig. 1, *G*) belongs to the part behind it and is separated from the areas at each side of it. This is further confirmed by a study of the ventral surface (fig. 2). Yet Audouin makes this the body of a bat-shaped sclerite in which the lateral areas represent the two wings. Finally, the only part that *is* distinct and absolutely a *separate sclerite* in nature is the plate designated *pseudonotum* (*PN*) in figures 1 and 2. Yet Audouin represents this as an integral part of the median region of the posterior notal subdivision in front of it! This combination he terms the *postscutellum* (*pscl*). A common sense separation of the plates along natural sutures could never produce such a plan of organization as figure 3.

This criticism should be directed not against Audouin so much as against those present day entomologists who have contentedly copied Audouin's drawings instead of examining the subject for themselves. Furthermore a study of the works of modern insect morphologists who attempt to establish the quadruple tergal theory for all insects, as Berlese (1906), shows that this can be done only by a free use of the imagination in laying down lines where nature has neglected to do so.

Now, although we are forced to discard Audouin's historic illustration of the four divisions of the tergum, yet his terms *prescutum, scutum scutellum* and *postscutellum* are very convenient ones to retain, for it is true that in a very large number of insects especially in all of the higher orders, four fairly well marked tergal subdivisions are present. To what extent these subdivisions occur the writer will attempt to show in a future paper on the insect thorax. But, though they are of very general occurrence, they are purely secondary and, in most cases are not homologous in the different orders. They are best developed in the Lepidoptera, Hymenoptera and Diptera. As has already been stated the transverse ridge on the ventral surface of the Coleopteran tergum (fig. 2, *w*) does not exist in the other orders. Hence, we may regard the subsclerites 2 and 3 (fig. 1) as secondary divisions of one original area. Then we can re-apply Audouin's names as follows: region 1,

prescutum; 2 and 3, the separated and divided halves of the *scutum;* 4, *scutellum;* and *PN, postscutellum.* The postscutellum (pseudonotum) is not present in any Orthoptera. The apparent four divisions of the Acridiid pronotum are secondary and due to internal ridges, the principle of which assists the notum to perform its double role of notum and pleurum.

The following is a brief statement of the fundamental structure of the tergum of any wing-bearing segment (cf. text, fig. 1):



Observe first the two tergal plates, the notum (*N*) and the pseudonotum or postnotum (*PN*). The former is the only tergal plate of nymphal forms and of all stages in Orthoptera. It carries the wings by its anterior and posterior wing processes (*ANP* and *PNP*), while its posterior angles are produced into the axillary cords (*AxC*) which form the posterior margins of the basal membranes of the wings. On the ventral side the notum presents an anterior and a posterior marginal ridge generally folded down upon the ventral surface, the second often leaving a wide, free reduplication back of it. Between these but nearer the second is a V-shaped ridge, the entodorsum of Amans (1885), with its apex forward. These three ventral ridges commonly show on the dorsal surface as three lines (*anr, v* and *pnr*). This structure is fundamental, and common to

all insects, though obscured in a few cases through the greater development of secondary characters. In the higher insects the notum becomes subdivided by secondary lines or actual sutures into a prescutum, scutum and scutellum. These subdivisions are not necessarily coincident with the lines of the ventral ridges and are not homologous in all the orders where they occur.

The pseudonotum (*PN*) lies behind the notum (*N*), is free from the wings, connects with the epimera laterally, and bears the postphragma (*Pph*). When the notum presents a prescutum, scutum and scutellum, the pseudonotum may conveniently be called the "postscutellum."

References.

1820.—Chabrier, J.—Essai sur le vol des insectes—Mém du Mus, d'Hist. Nat., VI, 1820, pp. 410-472, pls. 18-21.

1824.—Audouin, V.—Recherches anatomique sur le thorax des animaux articulés et celui des insectes hexapodes en particulier.—Ann. Sci. Nat., I, 1824, pp. 97-135, 416-432, pl. 8 (illustrating the thorax of *Dytiscus circumflexus.*)

1826.—Kirby, W. and Spence, W.—An introduction to entomology, Vol. III, London, 1826.

1828.—Straus-Durckheim, H.—Considerationes générales sur l'anatomie comparée des animaux articulés, 435 pp., 19 pls.—Royal Institute of France, 1828. (Detailed description of *Melolontha vulgaris.*)

1832.—Burnmeisteb, H.—Handbuch der Entomologie, Vol. I, Berlin, 1832.

1839.—Newport, G.—Insecta.—Todd's Cyclopædia of Anatomy and Physiology, Vol. II, pp. 853-994, figs. 329-439. London, 1839.

1885.—Amans, P. C.—Comparisons des organes du vol dans la série animale.—Ann. Sci. Nat., Zool. Ser. 6, XIX, 1885, pp. 9-222, pls. I-VIII.

1889.—Kolbe, H. J.—Einführung in die Kenntnis der Insekten. Berlin, 1889.

1903.—Verhoeff, K. W.—Beitrage zur vergleichenden Morphologie des Thorax der Insekten mit Berücksichtigung der Chilopoden.—Nova Acta. Abh. der Kaiserl. Leop.—Carol. Deutschen Akad. der Naturf., lxxxi, 1903, pp. 63-109, pls. VII-XIII.

1906.—BERLESE, A.—Gli Insetti.—Societa Editrice Libraria, Milan, 1906.

1908.—SNODGRASS, R. E.—A comparative study of the thorax in Orthoptera, Euplexoptera and Coleoptera.—Proc. Ent. Soc. Washington, IX, 1908, pp. 95-108, pls. II-V.

EXPLANATION OF PLATE VI.

Fig 1.—Metatergum of *Dytiscus circumflexus*, dorsal view.
Fig. 2.—Same, ventral view.
Figs. 3, 4.—Copies of Audouin's drawings of metatergum of *Dytiscus circumflexus*.
ANP, anterior notal wing process.
ANR, anterior notal ridge.
Aph, prephragma.
1Ax, first axillary sclerite of wing base.
2Ax, second axillary.
3Ax, third axillary.
AxC, axillary cord, forming posterior margin of base of wing.
G, median notal groove.
i, points of articulation of pseudo-notum with epimera.
Mb, membranous area of notum.
MD, muscle attachment on anterior edge of notum.
PN, pseudo-notum.
PNP, posterior notal wing process.
PNR, posterior notal ridge.
Pph, postphragma.
psc, prescutum.
pscl, postscutellum.
r, united bases of anal veins fused with arm of notum.
scl, scutellum.
sct, scutum.
V, entodorsum, V-shaped ventral ridge of notum.
v, lines on surface of notum formed by ventral ridge V.
w, transverse ridge on under surface of notum, peculiar to Coleoptera, and lines on surface of notum formed by it.

The New Jersey Records of Hesperotettix brevipennis (Thomas). Orthoptera.

By JAMES A. G. REHN.

In 1874, Thomas described this species from "material taken in New Jersey in August and communicated * * from Prof. Uhler through Prof. Glover." Three years later Uhler recorded specimens of the species as *Hesperotettix viridis*, a western form with which he had either confused it or considered it synonymous. In this paper the discoverer of the species mentioned "cranberry fields of Atlantic County" and we can assume this to be the original and consequently type locality.

Scudder in his revision of the Melanopli (p. 64) mentions material from "New Jersey," and until the year 1908 all our knowledge of the species from New Jersey as found in the literature is given above. In 1891 to '96, Morse had taken it at Wellesley, Massachusetts, in numbers and it was also recorded by him from Walpole, Massachusetts, while Scudder assigned material collected in Georgia by Morrison to the species. In the years 1904 and 1907, Morse recorded specimens from Sand Mountain, Georgia and Cheaha and Lookout Mountain and Turnipseed's Ranch, Alabama. In Massachusetts the insect frequented tufts of bunch-grass and was taken between July 10 and August 30, the first date, however, nymphs alone were taken. At Sand Mountain, Georgia, Morse took it from bunch-grass in open deciduous woods.

Along with other material placed in my hands for determination during 1908 by Prof. John B. Smith was a single female of this beautiful species taken at Anglesea, New Jersey, September 6. Quite recently Mr. W. T. Davis, of New Brighton, Staten Island, sent me for examination a specimen taken at Lakehurst, Ocean County, New Jersey, on August 17, 1907. While collecting at Stafford's Forge, Ocean County, New Jersey, during the past summer, the writer collected four males and five females of this species on August 12 and September 5. The individuals were found to be extremely local, occurring only in a small area of huckleberry and sweet fern barrens on the edge of pine forest and close to a large cranberry bog. The latter fact has no significance to me as the barren they preferred is extremely dry and without any bracken, sphagnum or "branch" plants, and the proximity of the bog appears to be but a coincidence. During a number of days' stay the bog and surrounding pine-land were repeatedly examined and the huckleberry and sweet fern section was the only area in which the species was found.

A single male of the species taken by Dr. Harry Fox, September 7, 1908, between Mt. Pleasant and Formosa Bogs, Cape May County, New Jersey, has also been examined. It was captured in oak and pine woods.

Rediscovery of the Bibionid Genus Eupeitenus

By D. W. Coquillett.

In 1834, Macquart describes *Penthetria atra* new species from a specimen in Servilles collection, taken at Philadelphia, and, in 1838, he erected for it a new genus, *Eupeitenus*, giving a short description and a crude figure. Walker, in 1848, referred two specimens to this species, the one from St. Martin's Falls, British America, the other from Nova Scotia, but threw no light on the characters of either genus or species, and it is not certain that his identification was correct. The species does not appear to have been recognized since, and heretofore has been referred to as a synonym of *Biblio heteroptera* Say, a member of the genus *Plecia*.

Wing of *Eupeitenus*.

Among a small collection of Diptera made by Mr. H. S. Harbeck, of Philadelphia, is a specimen agreeing in the main with Macquart's description and figure of the species mentioned above. This specimen is a female, while Macquart's was a male, and this difference, taken in connection with Macquart's well-known inaccuracy, renders the identification very probable. The specimen was captured at Germantown, a suburb of Philadelphia, on April 26, 1908. The head and its members, as also the body and legs, are essentially those of a *Plecia;* the first joint of the hind tarsi is not swollen, as the figure indicates, but this may be a secondary sexual character. The second submarginal cell is much longer than the first posterior, the first basal is decidedly longer than the second basal, and the fourth vein forks a short distance beyond the small cross-vein (see Fig. —). In all other respects this specimen agrees fairly well with Macquart's figure, and, as it came from the same locality as the type, there can be little doubt as to its identity.

The genus *Eupeitenus* is a valid one, readily distinguishable from our other Bibionid genera by the presence of two submarginal cells in each wing.

A New Species of Ceratophyllus

A GENUS OF THE SIPHONAPTERA.

By Passed Assistant Surgeon Carroll Fox, P. H. & M. H. S., San Francisco, California.

Ceratophyllus multidentatus spec. nov.

Seven specimens in all, two females and four males from *Microtus californicus,* one female from the nest of the wood rat (*Neotoma*). Mr. Rothschild kindly examined these fleas for me and *believes them to be* a new species.

Female.—Head gently and evenly rounded from posterior border to the anterior ventral angle. Frontal notch very low down. Eye present, lower margin straight. Gena acutely pointed posteriorly, its lower edge curving strongly upward anteriorly. Maxilla triangular, acute at apex.

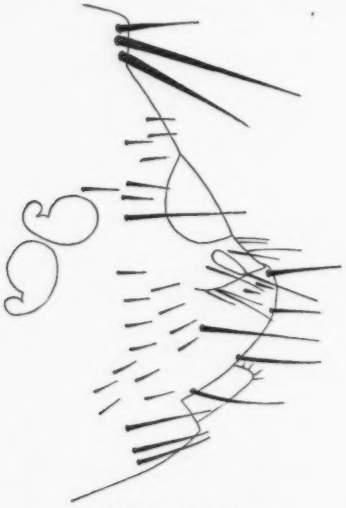
Head of male.

Genitalia of female.

Maxillary palpi reaching the middle of trochanters. Length of joints 12-14-11 and 15. Labial palpi including undivided basal portion, seven jointed, and reach to end of trochanters. Three rows of bristles on the genae. The lower row of three stout bristles the innermost placed above the eye, a middle row of four smaller and an upper row of six still smaller bristles. The usual number of bristles on the hind margin of the head, with two, a large and a small, at the posterior lower angle. Besides this apical row, there are on the occiput, three oblique rows of bristles, the posterior and middle row each consisting of six

bristles, of which the lowest is very much the largest, while the anterior row contains four or five smaller bristles. The antennal groove reaches within one-third of the top of the head, and is connected to the top by a chitinous thickening. The third joint of the antenna is nine jointed. On the margin of the second joint of the antenna are about five fine short hairs, while on the first joint there are about four. On the posterior margin of the antennal groove are several fine hairs.

The pronotum has two rows of bristles, an anterior row of about ten small bristles, and a posterior row of about eight larger, while on the posterior margin is a ctenidium of about 16 spines. The mesonotum has about five rows of bristles, a posterior of about ten heavy ones, the other rows being composed of more numerous, much smaller



Genitalia of female.

bristles, more or less regularly disposed. The metanotum has four rows of bristles, a posterior of about ten heavy ones, and the other rows being composed of more numerous but smaller bristles. The epimerum of the metathorax contains three rows of bristles; a posterior of three large bristles, a middle of three smaller, and an anterior of four still smaller.

On the abdominal tergites are three rows of bristles, a posterior of about 12 or 14 large ones; the bristles in the anterior and middle rows being more numerous but much smaller. On each side of the first six abdominal tergites are teeth as follows, 3-6-5-5-3-1. The abdominal

sternites have three rows of bristles; the posterior consisting of about six large bristles, and the middle and anterior consisting of smaller bristles, more or less regularly disposed. The middle row of the seventh sternite has about 12 small bristles. There are three antipygidial bristles on each side, the middle the largest and extending over the pygidium. The outer almost as long and the inner the smallest of the three. The eighth tergite dorsally contains about eight small bristles, and a long one below and anterior to the pygidium. Laterally there are two rows of bristles, the anterior composed of about six and the posterior about two, while on the apical edge there are about four large bristles. The eighth sternite is stout and has at its tip some fine short hairs. The style is cylindrical, about three times as long as wide at the base, with a long bristle at its end. The substylar flap has several long hairs on its margin. There is a double spermatheca.

No teeth on inner side of hind coxae. The fore-femur has on its inner surface about eight hairs irregularly distributed, while close to its upper margin there is a row of about five very small hairs, starting at its middle and extending to its distal extremity. This row may also be found on the middle and hind femur. Along the lateral surface of the middle and hind femur there is no row of bristles as usually seen in the Syphonaptera, but there are three or four subapical bristles. Arrangement of spines on hind tibiae usual to the *Ceratophyllus*. About sixteen small bristles on the side of hind tibiae, arranged more or less regularly in two rows. A row of small bristles on the anterior surface of all tarsi. Fifth tarsal joints on all legs with five lateral spines. None of the apical bristles on the tarsi or tibia of hind leg longer than the next preceding joint. Length of joints: Hind tarsi, 27-23-15-9-13. Mid tarsi, 17-15-10-5-12. Size, 2.56 mm.

Male.—Head somewhat flattened on top and more abruptly rounded than in the female. Antennal groove extends nearly to top of the head. In the male specimen under examination the labial palpi seems to be but six jointed, including the basal undivided portion. First six abdominal tergites with teeth on each side, as follows: 3-6-6-6-5-4. Three antipygidial bristles, the middle the longest.

Modified Segments.—The manubrium of the claspers is short and thick and extends ventrad. The process is cone-shaped and contains at its apex a small bristle and just posterior to this a large one, while near the apex there are five small, but stout bristles. Just above the insertion of the claspers there is a slight protuberance which contains a long bristle. The finger is long, its upper half somewhat wedge-shaped, narrowed and rounded at the apex. Its anterior edge is straight, ending above its insertion in a deep notch. The posterior edge is longer and is gently rounded to the base where it is abruptly curved upward to the pedicle, which has the shape of a shoe. On the upper half

of the posterior edge, there are about six small bristles while on the lateral surface are numerous small hairs.

The ninth sternite is expanded at the tip, becoming somewhat fan shaped, and at the anterior and posterior angles of this expansion there are several minute hairs.

The eighth sternite is heavy, club shaped and contains numerous stout bristles at its tip and posterior upper margin.

The plate of the penis is short and very broad and bluntly rounded at the apex. Size 2.32 mm. Color pale brown.

The Manner of Attachment of Parasitized Aphids.

C. N. AINSLIE,
Bureau of Entomology, Washington, D. C.

During the progress of some recent inquiries by members of the Bureau of Entomology into certain habits of parasitized aphids and their guests, some exceedingly interesting facts have been ascertained and are here put on record.

It has long been known that an aphid, when parasitized, died at a certain stage of the development of the parasitic larva, and in spite of its death, managed somehow to retain its position on the host plant until after the escape of the adult parasite. It has been surmised that the death grasp of the aphid's claws might account for the ability to hold itself to a leaf while its unwelcome guest completed its life cycle. But an aphid, dead for a week, has brittle legs, and would naturally be an easy victim to wind and storm. Some have supposed that the parasitic larva was able to force a glutinous fluid through the pores of the ventral wall of the body of the aphid, fastening it in this manner.

Without definite hope of getting any light on this question, a parasitized individual of the common *Aphis brassicae* was studied. This aphid had been removed from the host plant where it was standing on the leaf, dead, and was placed on the stage of a microscope, back down. It was not yet spherical, was turning brown, and the body was still flexible. It lay on the glass slide unwatched for a few minutes, and it was then noticed that the internal larva was protruding from a rent in the ventral region of the aphid and was apparently endeavoring to escape. The larva was driven back and the aphid's

body turned to a normal position, feet down. Within a minute or two the body was found to have become firmly fastened to the slide. The slide was then turned over and returned to the stage, the body of the aphid suspended below. Through the glass the now active larva could be seen as through a window, while it completed its task of making the aphid's skin fast to the slide. A smear of glutinous fluid along the torn edges of the opening seemed to have been the first move, followed by ceaseless spinning of a silken thread from the mouth of the larva back and forth across the rent and then all over the interior of the aphid's body, thus making a delicate cocoon for itself. The drying of this silken tissue and the gradual increase of threads spun across the opening through which watch was kept, rendered the view more difficult as time went on, and finally it was impossible to distinguish clearly what was taking place within because of the opacity.

Several more parasitized aphids of the same species, taken at about the same point of development of the larvae within, were placed under constant observation, and it was learned that each was torn or split down the median ventral line, almost from coxae to cauda, by the muscular movements of the enclosed larva. This clearly did not happen by accident, for each larva went through the very same performance described above. Why the aphid's body should open along the median ventral line, the only place where it could be utilized by the helpess larva within rather than across the back where it would be disastrous, is not known at present, but the fact remains that the larva is in this manner afforded an opportunity to secure itself against possible danger by fastening its frail cover strongly to the plant.

Previous to the appearance of this opening, one larva, not as far advanced, was watched through the thin walls of the aphid's body, and was seen to make a complete circuit of the interior in twenty-one minutes, driven slowly around by a series of pulsations, one hundred and eleven of which were required to bring the head again to the point from which it started. These movements probably vary with the temperature, time of year and maturity of the larvae.

The experiment of leaving the dead aphid on its back was tried, and the parasitic larva allowed to produce the usual rent in the host while in this unlooked for position. The larva did not quit its home, but made desperate efforts to reach something tangible and which it clearly expected to find. Failing in this it smeared the edges of the torn opening with a profuse supply of silk, but was helpless to adapt itself to the abnormal condition. When finally inverted it rapidly attached the host body to the glass and closed itself in as usual.

Rhopalosiphum persicae was observed to anchor itself, when parasitized, in precisely the same manner as *Aphis brassicae*, the body of the host being torn and immediately fastened to the glass by silken threads spun by the larvae.

Mr. E. G. Kelly, of the Bureau of Entomology, has ascertained that the individuals of the well-known, potentially pestiferous *Toxoptera graminum* when parasitized by *Lysiphlebus*, are attached in exactly the same manner by the parasitic larvae to the food plant, after the host has died a miserable and lingering death.

The above facts seem to be true only of Braconid parasites of aphids. Lack of material has prevented the acquirement of further knowledge concerning Chalcid, Cynipid or other parasites of plant lice, especially their mode of attaching the host to the plant. Larvae like those of *Aphelinus*, that do not alter the shape of the host when they produce its death, possibly trust to the death grip of the host's claws, or they may gum the ventral wall of the dead host to the leaf by a fluid forced through the body pores. At all events, an Aphelinus-parasitized aphid has a whole skin, apparently, and yet seems to be slightly glued to the host plant at death.

Mr. Henry L. Viereck has left Detroit, Mich., and is now at the Bureau of Entomology, Washington, D. C.

Preoccupied Genera in Lepidoptera.—*Pronuba* Riley, being preoccupied by *Megerle* in the mollusks, and by Thomson in the Coleoptera, I here propose for it the name *Valentinia*, in memory of our illustrious and lamented entomologist. *Dryoperia* nov. nom. for *Dryope* Chambers, preoccupied by *Dryope* Desv., and *Dryope* Bate, the former in the Diptera and the latter in the Crustacea.—Karl R. Coolidge.

An Artificial Ant's Nest.

By Dr. George P. Barth, Milwaukee, Wisconsin.

Pursuant to numerous requests to place a description of an artificial ant's nest which I have found very useful in studies of the habits of ants, the relations of inquilines and parasites to the hosts, etc., where it would be available to a larger number, the following is offered with the hope that it will prove of service to those interested.

The nest is made of two glass cylindrical jars of different diameters. The larger has a flange or a U-shaped curvature near the top. A Mason or candy-jar serves very well and is cheap. The smaller cylinder is somewhat shorter, usually about one to two inches, and is conveniently made by cutting off a bottle at the desired height. The difference in diameter of the jars may be as great or little as one desires, varying according to the size of the ant to be introduced. The smaller jar is placed within the larger and the space between the two rather firmly packed with moist earth or sand, the latter being the better as it leaves the glass clear and clean during the excavating. The escape of the ants is prevented by a cap of wire or cotton gauze loosely stretched over a rather heavy iron ring of somewhat larger diameter than the top of the larger jar. A stick or two, long enough to reach from the bottom to the top of the inner well, will provide the ants with means of access to and egress from the well.

The food cup is made by sharpening the end of a piece of tin three-quarters of an inch wide and moulding the other end into a cup. The sharp end is bent at right angles and forced into the soil between the jars. This brings the syrup and other food far enough away to avoid the soiling of the nest and thus to a certain degree preventing mildew.

The nest is easily darkened by slipping a cylinder of dark paper or cloth over the outer jar.

The advantages of this nest seem to be that:

First, it allows the ants to build vertically as well as horizontally, certainly more natural to the insect, thus giving deep and superficial chambers and galleries.

Second, the surface over which and through which the ant can burrow is very extensive and yet the nest occupies very little space and is very convenient to handle.

Third, the nest cannot be destroyed through the accidental displacement of an upper sheet of glass allowing the ants to escape, as the cover is held in place.

Fourth, it allows of a free view of the chamber and galleries from all sides. If an especially bright light is desired an electric bulb can be lowered into the well.

Fifth, the galleries and chambers have earthen roofs, floors and two sides. This is of distinct value in studying the ants' habits as they are found clinging to the roof of a chamber almost as frequently as they are on the floor.

Sixth, being of some depth the nest remains at different degrees of moisture, thus corresponding to the natural nest. The nest furthermore remains sufficiently moist over a long period of time, thus avoiding destruction through drying.

Seventh, the nest is quickly and cheaply made and is quickly and easily cleaned.

Eighth, tracings of the nest can be made by outlining the galleries and chambers on the outside with a grease pencil and taking a copy. I have found that the nest varies considerably from day to day in that some galleries and chambers are filled and others constructed.

Ninth, grass seed scattered over the surface of the ground will send down roots and provide aphid chambers and the like for such ants as build in grass plots. If a little care is exercised in not wetting the ground too much it will not "sour" or mould. I have kept such nests going for months and found the soil just as "sweet" at the end as at the beginning, the galleries and chambers of the ant and the free exposure to air by the gauze top keeping it sufficiently ventilated.

To start the nest the material gathered in the field—ground and all—is dumped into the inner chamber, the layer of earth or sand between the jars having been previously moistened. As the material introduced dries it will be found that the ants seek moisture by building in the artificial nesting site and

carry their pupa, eggs, etc., into the new chambers, the parasites and inquilines following. The well can then be emptied.

Keeping the outer cylinder of the nest dark will induce the ants to construct their chambers largely on that surface, thereby freely exposing them to view.

A few notes on December South Georgia Orthoptera.

By Morgan Hebard.

The Christmas holidays of 1908 offered me another opportunity to study the Orthoptera of South Georgia, at Thomasville. The fall had been extremely mild and consequently Orthoptera was more abundant than usual as late as December 18. On the afternoon of that date I visited the pine woods near the town and found particularly good collecting among the dead leaves under the scrub oaks scattered through the pine forest. In these localities *Schistocerca dmnifica* was plentiful, and one or two specimens each of *Odontoxiphidium apterum Belocephalus subapterus, Conocephalus fuscostriatus, Melanoplus keeleri, Melanoplus scudderi,* nymphs of *Atlanticus gibbosus, Arphia sulphurea* and *Falcicula* or *Anaxipha* were taken. In the pine woods undergrowth *Amblytropidia occidentalis, Aptenopedes sphenarioides* and *Orphulella pratorum* were abundant, while *Nemobuis ambitiosus* was frequently heard. In the nearby fields *Encoptilophus costalis, Orphulella pratorum* and an occasional *Schistocerca americana* and battered *Trimerotropis citrina* were discovered. A "branch" proved extremely unproductive until a small wet, grassy spot was found where two *Acrydium arenosum,* two *Nemobius carolina,* and five *Tettigidea lateralis* (four of the form *polymorpha,* as understood by Hancock), were captured. Other records made during my stay in Thomasville were two *Periplaneta truncata* found dead on the street, and one large female *Hapithus brevipennis* taken from a recess in a rail fence. Two immature *Orocharis* were also found, one under a sign on a pine tree and another living in a snug little nest indoors, made by curling up and fastening the tip of one of the fronds of a potted fern.

Notes on Contarinia sorghicola.

By GLENN W. HERRICK.

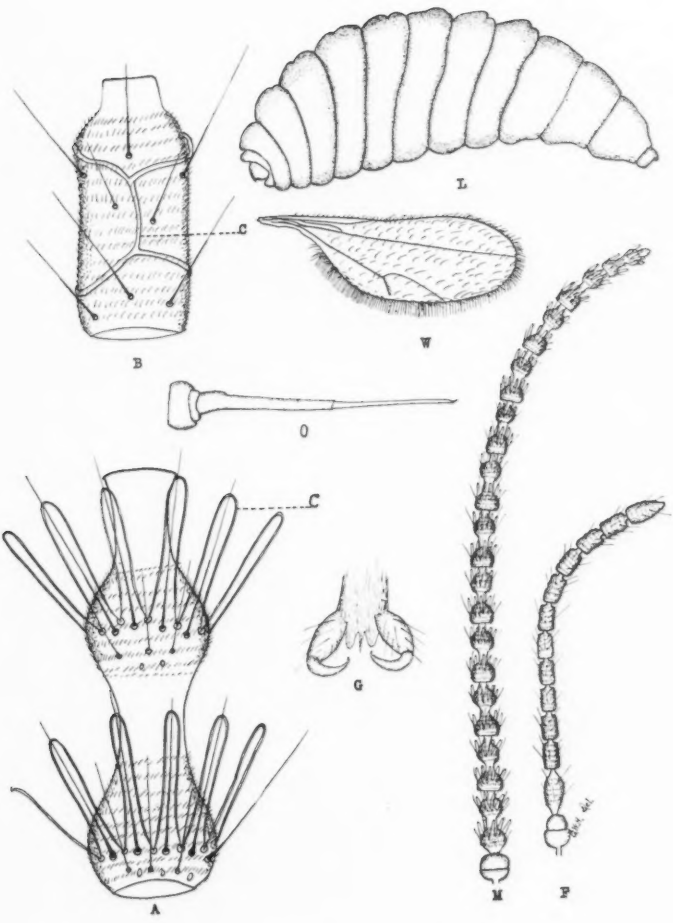
(PL. VII.)

Upon assuming the duties of Entomologist at College Station, Texas, October 1st, 1908, my attention was called to the serious and widespread injury to the seed of Kaffir corn and sorghum. In many localities in Texas a large part of the crop of Kaffir corn seed was destroyed and since this plant, in the drier parts of the state, takes the place of corn quite largely the failure to produce seed becomes a serious problem to the farmers in these regions. The cause of the "blasting" of the seed has been ascribed to various agencies, fungi, insects, unfavorable meteorological conditions, etc. Thinking that the trouble might be due to the work of an insect, I carried many of the heads of sorghum and kaffir corn to the laboratory and was gratified to find many small flies and an abundance of tiny hymenopterous insects issuing. In looking up the literature on sorghum insects I found that Mr. D. W. Coquillett had described a fly, bred from sorghum heads sent him by Mr. R. H. Price from this College in 1898, as *Diplosis sorghicola*. On submitting our specimens to Dr. Howard he informed me that Mr. Coquillett determined them as *Cecidomyia sorghicola*.*

The blasting is undoubtedly due to the work of this small Cecidomyiid, *Contarinia sorghicola*. On October 29th we bred many adults, male, and female, from sorghum and kaffir corn heads, together with an abundance of parasites, kindly identified for us by Dr. J. C. Crawford, as *Aprostocetus diplosidis* Craw. On November 29th I gathered five heads of Kaffir corn from the field and the adults of both species are still emerging. November 19. On the night of November 13th, we had quite a freeze at the College, the thermometer registering 27 deg. Of course, the heads were in the house and were not subjected to so low a temperature as 27 deg.

On November 20th, I brought several Kaffir corn heads into the laboratory to see if the freeze had been hard enough to kill the larvae and pupae. In an examination of the blasted

*Bull. 18 new series U. S. Bureau of Entomology, page 81.



HERRICK ON CONTARINIA SORGHICOLA.

L—Larva; W—Wing; M—Antenna of male; F—Antenna of female; O—Ovipositor; G—Genitalia; A—Segment of male antenna; B—Segment of female antenna; C—Circumfili.

grains, I found active larvae and, since then, hundreds of parasites and many adult *Contarinia* have emerged. The temperature was sufficient to form ice and to kill the leaves of the corn.

An affected head has a very characteristic appearance and is noted at once. The grains do not fill out and the head is much smaller and slenderer than a normal one, and becomes darker colored as though affected with a fungus disease. No doubt this appearance has led to the belief that the trouble was caused by a fungus.

The cast pupae skins may be seen in abundance clinging to the tips of the blasted grains. In an examination of many affected seeds I was able to locate the larvae and pupae. The larva lie inside the glumes and inside the delicate palet, in direct contact with the ovary at its base. It is quite evident that the larva sucks the nourishment from the ovary and prevents it from maturing. Although the ovary grows a little and increases in size somewhat, it finally turns dark in color and shrivels. In our future investigations, we hope to determine the length of the larval and pupal period and the number of generations. The pupa occupies same position as larva.

The female is a trifle over two millimeters long with a slender ovipositor (Fig. 1, o) when fully extended as long as the body. It is slender, tapering, sharp pointed, and seems to be hard and chitinous. The abdomen of the female is orange red while the head and palpi are yellow.

The antennae of the female are composed of fourteen segments, each segment, except first, second and last constricted into a short petiole at the distal extremity and clothed with long scattered hairs and with very short hairs arranged more or less in rows. The peculiar structures, known as *circumfili,* run longitudinally along the meson of each segment but branch at both ends and encircle the segment near its proximal and distal ends, (Fig. 1b). The antennae of the male are very characteristic. The segments, fourteen in number, are greatly constricted in the middle and at the distal ends. The thickened portion of each segment bears a whorl of characteristic *circumfili* (Fig. 1a). These are really long looped filaments, each loop being

continuous with the next at the base. So far as I have been able to determine there is no connection between the whorls of different enlargements. The segments also bear long hairs, usually one large hair below each loop and a smaller one alternate with the loops. In addition, rows of very fine hairs encircle the segments. The genitalia are shown in figure 1g. The wings are about twice as long as broad and clothed with fine scattered hairs. They also bear a fringe of long hairs along the hind margins (Fig. 1w).

This pest is going to be a difficult one to control and it may be that the main dependence will have to be placed upon parasites which evidently increase as the season advances and kill enough of the *Contarinia* to enable a late crop of Kaffir corn to mature its seed. If this proves true it may become necessary to plant late for a crop of seed. Of course, where the corn is desired for soiling purposes or for green feed, early planting is all right.

There is a second crop of Kaffir corn on the station grounds just maturing its seed, and the uninfested heads in this field averages in an extensive count, about ninety-one per cent. Nine per cent. of the heads were either badly or only slightly infested.

The number of adult *Contarinia* and of *Aprostocetus* bred from some of these infested heads is also interesting as throwing some light on the work of the parasite, perhaps. It would depend, altogether, whether there were one or more parasites to each host. The ratio of the emerging adults of parasite and host in these late heads is as six of the former to one of the latter.

At the time this paper was written, I was not aware that anyone had investigated the work of this pest. Later I find that Dr. C. R. Ball in 1907 came to the same conclusions regarding the sterility of sorghum and published a note on *Diplosis sorghicola* in Circular 13, Bureau Plant Industry, and again in Science Vol. XXVII., No. 681, pages 114-115, Jan., 1908.

Two little-known Aphids on Carex sp.

By C. P. GILLETTE.

(Pl. VIII.)

* **Brachycolus ballii** Gill.

In Canadian Entomologist for 1907, p. 67, the writer gave a description of the apterous viviparous, and oviparous females and eggs of this louse and its host plant, *Carex nebraskensis*.

At that time the alate form, though much sought for, was unknown to me. While spending a day at the home of Senator J. H. Crowley, near Rock Ford, Colorado, June 1st, 1907, a single alate viviparous female was found upon a rank growth of *Carex* along an irrigating ditch. Nearly every leaf was infested by this louse in various stages of development, but not another winged louse or pupa was seen. The louse has been common upon *Carex* in the vicinity of Fort Collins all through the summer and fall where both Mr. Bragg and myself have kept a close watch for the winged form but without finding it. so I am giving the following description and Fig. 5 of Plate VII, from the single example which had the right wing injured so as to obliterate most of the venation. I mention this fact as the branching of the third sector of the wing drawn seems as though it might be abnormal.

ALATE VIVIPAROUS FEMALE.

Head, thorax, antennae and legs black or blackish; dorsum of abdomen pale yellowish with a narrow transverse blackish dash upon the dorsum of each segment; each segment also having upon either lateral margin a dark spot, and upon segment 6 the lateral spot surrounds the cornicle; cornicles and cauda blackish, stigma of wing rather long and narrow, dusky; anterior wing hyaline with third transverse nervure thrice forked, which may be abnormal (the right wing was ruined in the single specimen studied); hind wing with one transverse vein only; cauda knobbed; anal plate bi-lobed; cornicles

*This species does not seem to me to fit any known genus well. It differs from Buckton's characterization of *Brachycolus* by having a longer 7th joint of the antenna and by having a knobbed, rather than a pointed cauda. The latter difference is a rather serious one allying it with the *Callipterini*.

mere pores but plainly marked; legs very short. Length of body 1.70 mm.; length of wing 2.43 mm.; length of antennae 1.06 mm.; joints of antennae about as follows: Joints I and II together .14; III, .31; IV, .17; V, .20; VI, .16; VII, .09 mm. Joint III of the antennae has 7 rather small circular sensoria in a single row (Plate I, Fig. 6). Length of hind tibiae, .54. There are neither ocular nor thoracic tubercles.

The males of this species have not been apprehended with certainty.

Callipterus flabellus Sanb.

This species was described by Prof. Sanborn from a single apterous female from a doubtful food plant and as it occurs in abundance at Fort Collins where we have taken winged and apterous viviparous females in abundance, additional notes and descriptions are here given. A quantity of alcoholic specimens sent to Prof. Sanborn were determined by him as probably the same as his type.

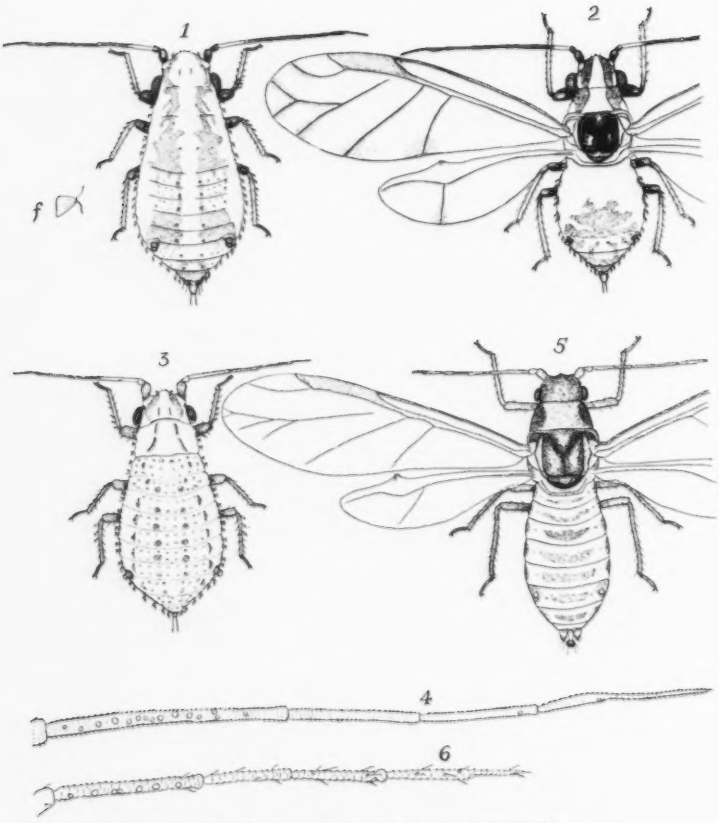
While the louse may attack some of the grasses, we have taken it by the thousand sweeping a small species of *Carex* that is common on low natural meadow land.

ADULT APTEROUS VIVIPAROUS FEMALE, PLATE I, FIG. 1.

The fully adult examples have been somewhat larger than Prof. Sanborn's type, and also differ somewhat from his description and figure by having the head less cone-shaped, though strongly convex, and the length (1.59 mm.) given for the antennae is probably a mistake as I have always found the antennae distinctly shorter than the body. It is probable that the figure 5 was intended for 3.

Specimens taken at Fort Collins may be described as follows:

Length, 1.70 to 2 mm.; width, .90 mm.; antenna, 1.40 mm.; 3d joint as long as 4th and 5th together; 6th a little shorter than 7th; and 7th a little shorter than 5th. The single small circular sensorium near the end of segment 5 is more distant from the end than usual, and a similar one (or two) occurs near the end of segmenet 6. All segments are free from true hairs but are thickly set with minute points giving the surface almost a velvety appearance as in the alate form (Plate I, Fig. 4); no frontal tubercles; head rather strongly pro-



GILLETTE ON CALLIPTERUS FLABELLUS.

duced on vertex; eyes dark red, prominent, without ocular tubercles; dorsum smooth or with very minute tubercles on small brown spots, but along the lateral margins are lines of small tubercles bearing flabellae; cornicles not longer than broad, somewhat dusky and upon a dusky field; cauda capitate, dusky; antenna dusky except basal half of joint three; legs short and stout, tibiae of hind legs but little longer than 3d joint of antennae; femora blackish; tibiae blackish at knees, paler below, tarsi blackish; tibiae with thickened or somewhat flabellate hairs on outer margin; beak very short, barely surpassing 1st pair of coxae; color a pale yellowish green peppered with small brown specks and having large darkened areas above. The dark areas extend along either side of the dorsum, beginning at the antennae and ending at the cornicles. They are broken into three pairs of blotches, one pair extending over head and prothorax, one pair upon mesothorax, and one pair upon abdomen before and extending to the cornicles; and there is a small one just before the cauda. Larval forms lack the large dark patches but have their backs finely peppered with dark specks and a dusky streak on either side of the median line upon head and prothorax as shown in figure 3.

WINGED FEMALE, PLATE I, FIG. 2.

Described from specimens taken at Fort Collins, Colo., June 8, 1908, by L. C. Bragg:

Length, 1.50 to 1.70 mm.; width, .70 mm.; antennae, 1.40 mm.; joints proportioned as in apterous form; 3d joint with about 15 very minute circular sensoria, not tuberculate; dark markings similar to apterous form except that the whole middle portion of mesothorax and metathorax above are black, and the mesothorax is black below; head broad between antennae, large; length of wing, 2.25 mm.; stigma short, broad and dark smoky in color as are the veins, each nerve ending in a dusky blotch; posterior wing with veins smoky also and with but one discoidal; otherwise like apterous form.

Comparatively few alate examples but many pupae were taken. Both apterous and alate forms are active jumpers. A few sweeps of the insect net will take this louse by the thousand now.

Sexual forms have not been studied.

EXPLANATION OF PLATE VIII.

Callipterus flabellus:—1, apterous viviparous female; f, flabellus of preceding much enlarged; 2, alate viviparous female; 3, larva of apterous viviparous female before last molt; 4, antenna of alate female; *Brachycolus ballii*: 5, alate viviparous female; 6, antenna of preceding. The lice are enlarged 20, and the antennae 80 diameters.

The Bees of Massachusetts: Osmia and Sphecodes.

By JOHN H. LOVELL, Waldoboro, Maine.

Since Professor Packard, almost fifty years ago enumerated the described species of *Bombus* and *Psithyrus* of New England, the Anthophila of Massachusetts have received very little attention. There are, indeed, besides the two genera named very few records of the bees of this State available. Some months ago I received from Mr. Charles W. Johnson of the Boston Society of Natural History a small collection of bees belonging to the genera *Osmia* and *Sphecodes* for determination. A list of the species is as follows:

SPHECODES.

Sphecodes pithanus n. sp.

♀.—Length 10 mm. Head and thorax black; abdominal segments 1-3 red, clouded with black, 4-5 black, 6 red. Head broad, face thickly covered with short white hair; mandibles red, simple; antennae black, the flagellum a dull red, joint 4 about as long as 3. Mesothorax faintly shining, with small not well defined punctures; wings slightly tinged with reddish, the second submarginal cell nearly quadrate, the first recurrent nervure enters the second submarginal cell a short distance in front of the second transverse cubital; stigma and nervures fuscous, tegulae testaceous; legs black, tibiae and tarsi red. Enclosure of the metathorax well defined, semi-circular, coarsely reticulated. Abdominal segments 1-2 nearly impunctate, 3-4 finely punctate at base, 5 all over; basal segment largely black, 2-3 maculated with black, 4-5 wholly black, 6 dark red.

Brookline, Mass., July 18, 1878, collected by S. Henshaw. In coloration this species most nearly resembles *S. pimpinellae* Robt.; from which, however, it is easily separated by its larger size (*S. pimpinellae* is 7 mm. long), simple mandibles, venation (*S. pimpinellae* has the second submarginal cell narrow, and the first recurrent nervure unites with the second transverse cubital), and by the color of the abdomen. The type is deposited in the Museum of the Boston Society of Natural History.

Sphecodes johnsonii n. sp.

♀.—A little over 10 mm. in length. Head and thorax black; abdomen red with black apical segments; mandibles almost entirely black, the extreme tips rufous, bidentate; antennae black, the flagellum

brownish beneath, joints 3 and 4 subequal. Face and vertex opaque, finely and densely punctured; clypeus with sparse, large coarse punctures, sides of face clothed with whitish pubescence. Mesothorax subopaque, with dense medium-sized punctures; wings strongly tinged with black, tegulae black, stigma and nervures brown-black; the second submarginal cell is strongly narrowed above so that it is almost triangular. The disc of the metathorax is coarsely reticulated but there is no distinct enclosure. Abdominal segments 1-3 are a deep red tinged with black, the basal half of segment 4 is red and the apical half black; segments 5-6 black; the basal segment is impunctate, segment 2 is impunctate in the middle, but finely and closely punctured laterally, the apical segments are finely and densely punctured, except on the apical margins.

The type, a fine specimen very carefully prepared and mounted, will be placed in the Museum of the Bost. Soc. of Nat. Hist. It was collected at Fall River, Mass., Sept. 7, 1908, by N. S. Easton. No other species of *Sphecodes* known to me has the wings so strongly suffused with black, or the abdomen so dark a red; the sculpturing of the metathorax is also characteristic. As in *S. ranunculi* Robt. the second submarginal cell is narrowed above, but in *S. johnsonii* the first and second transverse cubital nervures are separated by so small an interval on the marginal that the cell is nearly triangular. From *S. ranunculi* it may be readily distinguished by its form, color, punctuation, and in having joints 3 and 4 of the flagellum subequal, while in *ranunculi* joint 4 nearly equals 2 plus 3. This species is dedicated to Mr. Charles W. Johnson who has made many very valuable contributions to the advancement of the entomology of New England.

Sphecodes dichrous Sm. ♀.

Framingham, Mass., May 28, 1904; Norwich, Vt., July 4, 1808, C. W. Johnson.

S. dichrous Sm. ♀, *var.* smaller than tppe.

Monomet, Mass., July 27, 1905, C. W. Johnson.

S. dichrous Sm. ♂.

Fall River, Mass., July 9, J. A. Cushman; Auburndale, Mass., July 12, C. W. Johnson.

S. Minor Robt. ♀.

Brookline (Chestnut Hill), Mass., July 1, C. A. Frost.

S. persimilis Lov. & Ckll. ♀.

St. Johnsbury, Vt., June 27, C. W. Johnson; Essex, Mass., Aug. 1, C. E. Brown; Norwich, Vt., July 4, 1908, C. W. Johnson.

S. persimilis Lov. & Ckll. ♀, *var.* smaller than type.

Cohasset, Mass., June 6, 1908, Owen Bryant.

S. obscurans Lov. & Ckll. ♀.

Orr's Is., Me., June 24, Auburndale, Mass., Sept. 18, C. W. Johnson.

S. prosphorus Lov. & Ckll. ♀.

Brookline, Mass., Sept. 6; Norwich, Vt., July 4, 1908, C. W. Johnson.

S. prosphorus Lov. & Ckll. ♂.

Brookline, Mass., Sept. 6; Auburndale, Mass., Sept. 12; Norwich, Vt., July 4, 1908, C. W. Johnson.

S. ranunculi Robt. ♀.

Orr's Is., Me., July 25, 1907, C. W. Johnson.

S. ranunculi Robt. ♂.

Capens, Me., July 14, C. W. Johnson.

S. levis Lov. & Ckll. ♀.

Malden, Mass., Apr. 28, C. W. Johnson.

S. mandibularis Cr. ♀.

Auburndale, Mass., Aug. 21, C. W. Johnson; Martha's Vineyard, Mass., July 17, J. A. Cushman.

S. nubilus Lov. & Ckll. ♂.

Martha's Vineyard, Mass., July 17, J. A. Cushman.

S. clematidis Robt. ♂.

Monomet, Mass., July 27, C. W. Johnson.

OSMIA.

Very few species of *Osmia* have as yet been discovered in New England. "It is certain," says Professor Cockerell in a letter to the writer, "that the genus is a very large one with us, and since it seems to abound in the mountains and northward in the west I do not know why we do not see more species from the New England States."

Osmia stasima n. sp.

♀.—Length 11 mm. A stout bluish-green bee, distinctly and very densely punctured; with the vertex, thorax and basal abdominal segment clothed with hoary white pubescence. Head large, with bare, subquadrate front; clypeus purple, anterior margin entire, truncate; mandibles broad, black, feebly tridentate, the margin appearing almost entire, the interval between the second and third tooth broad. Antennae black, apical joints of the flagellum brown. Wings tinted with reddish-brown, marginal cell darker, nervures dark brown, basal nervure before transverse medial, tegulae black. Legs black (hind coxae blue), with light brown hair on tibiae and reddish-brown on tarsi. The apical abdominal segment is thinly clothed with fine, whitish hair; ventral scopa dense and black.

Collected at Rockport, Mass., July 16, by C. W. Johnson. This species is allied to *O. major* Robt., but the latter has the mandibles 4-dentate. *O. major* is said to closely resemble *O. atriventris,* which has the mandibular teeth salient and well-defined; but in *O. stasima* though the mandibles are large and broad their margin is almost entire or only slightly notched. If the specimen be viewed from the front the left anterior tibia has a small but prominent tooth on the outer apex. This type is in the Museum of the Boston Society of Natural History.

Osmia lignaria Say, ♀.

Fall River, Mass., May 6, J. A. Cushman; Winchendon, Mass., May 10, Dr. F. W. Russsell; Squam Lake, N. H., June 22, G. Mallen.

O. atriventris Cr. ♀.

N. Adams, Mass., June 14, C. W. Johnson; Cambridge, Mass., June 9, G. Mallen; Hyannis Port, Mass., July 3, C. W. Johnson; Orr's Is., Me., July 24, and Capens, Me., July 16, C. W. Johnson.

O. inspergens Lov. & Ckll. ♀.

Blue Hill, Mass., June 11, 1890, J. H. Emerton.

O. albiventris Cr. ♀.

North Adams, Mass., June 14, 1904, C. W. Johnson.

O. globosa Cr. ♀.

Framingham, Mass., C. A. Frost.

The nest of *O. globosa* was found April 24th under a stone, and the bee came out May 2. The cell was roughly fashioned

of mud on the outside, but beautifully glazed and polished within. The opening by which the bee emerged was rather larger than its body, and the cell or chamber was probably closed by a lid as in the English *O. xanthomelana*. The species of *Osmia* vary greatly in the manner of constructing their nests; some tunnel in sandy banks, posts and decayed trees, while others use tubes and small cavities already formed. Several American species are known to construct earthen cells about half an inch in diameter.

A new species of Andrena.

By H. L. Viereck, Washington, D. C.

Andrena carolina n. sp.

♀.—Length about 10 mm.; occipito-clypeal distance* greater than the ocular distance,† facial fovea extending below the antennal line,‡ the former with its greatest width greater than two-thirds of the shortest distance between the lateral ocellus and nearest eye, third joint of antennae longer than fourth, plus fifth, but shorter than fourth, plus fifth, plus sixth, clypeus punctured, polished, with a median longitudinal impunctate area, process of labrum broadly rounded; abdomen with the second dorsal segment depressed less than one-half the distance between base and apex of the same segment, abdomen fasciate. Tegment almost throughout black or very dark brown in color, most of the hairs pale ochreous, the great majority of the hairs of the tibial scopa not branched but simple.

Type locality, North Carolina, U. S. A.

Type in the collection of the Amer. Ent. Soc., Phila., Pa.

Notes on Two Argiopid Genera.—Crosby (Proc. Phila. Acad. Sci. LVII, 1905) proposed for the Genus *Dicyphus* Menge, preoccupied in the Hemiptera, the name *Hypomma*, but as Mr. F. P. Smith (Journ. Quekett Micros. Club, London, IV, 1904) has for the same reason given it the name Enidia, Crosby's genus must fall. Even were this not so, *Hypomma* would have been invalid, as Dahl in 1886 used that name for a Theridid genus. *Smitheria* nov. nom., type (*Neriene*) (*Falcoeria*) *cornuta* Blackwall, for *Falconeria* Smith, preoccupied by Theobald in the reptiles.—Karl R. Coolidge.

* The distance between the highest point on the vertex and the middle of apex of the clypeus.

† The distance between the outermost point on each eye.

‡ An imaginary straight line drawn tangent to the lowest point in the lowest point in the edge of each antennal fossa.

Another Season with Catocalae.

By R. R. Rowley.

During January and February I received small lots of eggs of *Catocala nupta, electa, elocata* and *fraxini* from J. McDunnough, of Berlin, Germany, and C. Leonhard, of Kearney, New Jersey.

Not aware that the weather of early March was warm enough to affect these eggs, I lost much of this European stuff before the middle of the month, the larvae dying before I knew of their hatching. The few remaining eggs of *electa, nupta* and *elocata,* which I supposed infertile, hatched about the last of the month before there were any leaves on which to feed them. Furnishing the young crawlers (more properly "gallopers," for young *Catocala* larvae are the most energetic insects I ever had anything to do with), split buds until I could get leaves from slips of willow and poplar placed in tumblers of water in a warm room of the house.

The *fraxini* eggs hatched later and did well from the beginning, though their development was slow. The growth of the larva of this latter species must be as strong in captivity as in its wild state since the caterpillar is the largest of the "Cato' worms" and the imago much larger than any of our American species of the genus. The handsomest larva of these species is that of *electa,* a real beauty.

A quill of eggs labeled *sponsa* gave larvae that refused oak and took to poplar after most of them had died. A single imago told the story. It was *nupta.*

The growth of these European caterpillars was really exasperatingly slow, but most interesting in a developmental way. All of them fed on the food plants of *cara, amatrix* and *parta,* and the larvae all bear no little resemblance to the American species, all having a cross elliptical elevation or dorsal hump over the fifth abdominal segment and the latero-ventral row of short setae.

After the first moult, the larvae of *C. fraxini* are very light in color and so contine to the end of the larval stage.

I am almost tempted to minutely describe these larvae from

the full notes taken during their development, but this has been done, doubtless, by a number of European writers.

The larvae of *C. clocata* and *nupta* hide themselves when not eating (in daylight) under leaves and paper in the bottom of the jar, while those of *C. electa* and *fraxini* remain on the plant stems, rarely, even when making ready to moult, go to the bottom.

While busy with the above-mentioned species, the few eggs of *Catocala ilia,* which Mr. E. A. Dodge had given me, hatched on the 8th and 9th of April. Before the first moult, which occurred on the 18th, the larvae are light colored, striped longitudinally, with fine lighter and darker lines. Four low lateral darker-brown, roundish spots to third abdominal segment and a smaller one in front of the last abdominal segment. The head hardly darker than the body.

Before the second moult, which occurred on the 21st, the larva is somewhat darker, especially along the dorsum near the posterior end. The lower row of lateral large spots are strongly pronounced and black. Dorso-laterally, there is a row of black dots (to each side). These rows, less strong, are present before the first moult.

Head black. Before the third moult, the larva is nearly three-quarters of an inch long, gray, with a line of elongate, somewhat-lunulate dark dashes, mid-laterally, and two pairs of subdorsal dark, elongate spots on the two segments just in front of the first pair of prolegs. Head grey.

The larva moulted the third time on the 25th. Body light ashen gray, the black longitudinal lunulate lines almost disappearing. The pro as well as true legs light gray, with black dots (two to true leg and one to the pro-leg). The longitudinal, lateral lunulate lines dim and but little darker than the body color. The body of this larva from the hatching is rough or sand-papery looking. After the third moult the body is more visibly covered with low, raspy tubercles and short bristles. In front of the fourth pro-leg on either side of the dorsum is a small quadrangular black spot. Head light gray, with a brownish lateral dash. A latero-ventral line of fringe or setae.

Just after the fourth moult, the larva is over an inch long,

light gray, with darker markings. The dorsal light gray band of alternately expanded and contracted portions with irregularly shaded black spots above the lateral band of light gray. Above the pro-legs and true legs is a line of narrow black lunules. On top of the first abdominal segment is a large triangular (angle pointed toward the head) white spot. A lateral row of setae just above the true and prolegs. Head gray, with a lateral black dash passing entirely around. A black dot on each side of the head inside the black dashes. The true and pro-legs are gray, with white dots.

After the fifth moult the larva of *ilia* has a general ground color of light gray, with darker irregular longitudinal markings. The tubercles slightly yellow at the tip. Prolegs and feet light gray and dotted with black. Head gray, mottled with brown. A slight lateral darker dash. Larva decidedly flat. Underside, a beautiful pink, with the characteristic black spots. The lateral setae are short. The mid-lateral, longitudinal band, irregular and the lightest shade on the body. The dorso-lateral tubercles on the first abdominal segment as well as the fifth are stronger than the others. I failed to secure a pupa from the *ilia* larvae, the last two dying when fully mature. Mr. E. A. Dodge informs me that the food plant of *ilia* is burr-oak. I tried to feed them through on chinquapin oak.

On the 25th of April, in company with Mr. E. A. Dodge, I collected 50 larvae of *Catocala illecta* on honey locust sprouts. These varied in size from half an inch in length to quite two inches. Mr. Dodge found quite as many, and together we got six or seven small larvae of *C. innubens* from the same plants.

The larva of *illecta* is unlike that of any other *Catocala* larva with which I am acquainted. Its colors make it very conspicuous and it must suffer much from parasitic enemies. The full-grown larva has a longitudinal white band below the spiracles. A dark brown, almost black body color crossed by narrow, irreguar white lines and with a spiracular row of red-brown spots (one to the segment) and another lateral (sub-dorsal) row of somewhat more pronounced red-brown spots, two to the segment. The red spots on the thoracic segments often coalesce forming cross bands of red. Head dove color, with three lat-

eral longitudinal black dashes and a central short one and two small lateral black spots on the top of the head. The true legs dark brown, so also the pro-legs. The under side of the body cross lined with black, and white as above, but paler.

The ventral roundish or quadrangular central row of spots black, but not intensely so. Little change in the larva from hatching to maturity in color and markings. The cross lines of white, the red-brown spots and the broad white under-spiracular band are the characteristic markings.

On April 27th I got 14 larva of *illecta* on low honey locust sprouts in a cow pasture across the street from where I live. These were all small and apparently moulting the third time. They lie close to the twig, usually a dead one, if such is on the bush, or on a bare twig, sometimes two or three quite close together. Very small larvae, probably just after the second moult, often lie along the side of a thorn and are difficult to see. A shriveled dead branchlet is a favorite place for these young larvae. I have noticed the same preference for a dead twig in the young larvae of both *C. piatrix* and *C. cara.*

On April 28th I found 30 more larvae of *C. illecta* and 101 on May 2d. Also one *innubens* larva on the latter date. May 9th, 25 larva of *C. illecta.*

A full-grown larva of *illecta* is two and a half inches long. The longitudinal subspiracular band is pearly white. The cross lines of black and white are seven or eight each to the segment. The row of brick-red spots along the spiracles shows strongly against the pearly white band below. Another more prominent subdorsal row of red spots. The end segment of the true legs is black. The pro-legs are striped crosswise. The ventral black spots are large and the ones between the pro-legs the largest.

The first *illecta* larva began to spin its cocoon on the 5th of May and pupated on the 8th. The first larva of *innubens* pupated May the 20th.

The chrysalis of *illecta* is from one and one-half to one and three-quarters inches long, deep red-brown and covered with a whitish prunescence that makes the pupa look black beneath the bloom. The larva spins a thin cocoon inside leaves and twigs, more often several inches above the bottom of the breeding jar than in the paper on the bottom.

Most of the larvae were collected after several hard frosts had killed the leaves of the plants most exposed, and when taken from the dead-looking sprouts were quite benumbed with cold. The number of parasitized larvae were few and the caterpillars thrived well in 6-gallon tin cans. A number of the larvae, after spinning, were unable to shed their skins and perished. The percentage of chrysalids that failed to yield moths was small. All in all, it is a very satisfactory larvae to handle, barring the odor from the ordure and the dropping leaves. In fact, the character of the plant and the great number of the larvae made it nearly impossible to keep the breeding cans clean and odorless, and the loss in larvae was mainly due to that cause. The first imago of *illecta* came from pupa May 30th, making the length of pupal stage 22 days.

From the two hundred and twenty larvae collected, one hundred and fifty pupae were secured, and from these latter, over a hundred perfect imagoes. The last imago appeared June 21st. From the unusual abundance of the larvae, one would think the imagoes could be readily found, but not a moth did I see in the woods or brush in the daytime. The only illectas I ever took were at bait at night. The apparent kinship of *illecta* and *abbreviatella,* at least in color, suggests the probable likeness of the larvae of the two species and the probable kinship of their food plants. Neither in the larvae nor in the imagoes is there any color variation worth mentioning in *illecta.*

Freshly hatched larvae of *Catocala vidua* are of an almost transparent greenish brown, becoming a dark amber, with very dark heads. Eggs of this species hatched May 10th. Toward the second moult the larva becomes lighter and more or less streaked longitudinally. After the second moult much lighter and still streaked lengthwise. The subdorsal streaks blacker on the top of the second and third abdominal segments. Body quite bristly. The top of the fifth abdominal segment a little darker than the rest, but with little appearance of being humped. True and prolegs light gray. After third moult, larva one and one-quarter inches long, quite light. Lateral row of setae. Head gray-brown with longitudinal fine darker lines and a short, dark side-dash. As after second moult the sub-dorsal

lines on the second and third abdominal segments are distinctly black and like long, slender triangles. The hump over the 3d pair of prolegs more pronounced and darker than the rest.

The fourth moult occurred May 30th, and the larva was quite two inches long, slender, lead-gray, with markings as after third moult.

The head of the mature larva is gray, streaked with lighter color and a short unnoticeable black dash either side of the mouth. Body light gray with a faint reddish brown tint. Lower lateral row of bristles or setae. Tubercles reddish. A cross triangular saddle-like spot over the 5th abdominal segment. Under side of body leaden with round black spots shaded behind by deep red. No hump.

This larva seems very difficult to rear in confinement, as all of my specimens died before time to pupate, the last one on June 13th. In the past six or seven years, this moth has not been abundant here, despite the fact a single female in captivity laid for Mr. Dodge 871 eggs. Atmospheric or weather conditions, breeding disease, are responsible for the fatality among *Catocala* larvae and not their parasitic foes. These larvae were fed on shag bark hickory which Mr. Dodge assures me is their food plant. However, after searching for three years, I have yet the first larva to find in the woods, though I have taken caterpillars of *C. epione, residua, habilis, obscura, angusi* and *robinsoni* on hickory. As large a "worm" as it is, when full grown, it is difficult to see how it can escape the collector.

Another species about as common as *vidua* and often taken with it on white oak is *C. robinsoni,* a single female of which laid 902 eggs, Mr. Dodge informs me. The same gentleman secured from a female of *C. amatrix,* a rare moth here, 436 eggs.

While the past season was certainly unfavorable for *Catocala* larval growth in most species, it was singularly favorable for the growth of *C. illecta* larvae, despite the killing frosts of April.

During this season, as through last summer, on the same walnut bush and the same willow I took larvae of *piatrix* and *cara* from the 29th of May to the 10th of August, but did not

succeed in getting a single *piatrix* larva through to maturity and but two or three of the *cara,* despite the attention I gave the caterpillars.

On the 27th of May a few eggs of *C. piatrix* that I had kept to note the early stages of the larva hatched, and at one day old the caterpillar was very small, slender, with a yellow colored head and with the front half of the body green and the last half yellow-green. Like all other *Catocala* larvae, young *piatrix* is very active and hard to keep from escaping.

On the 30th of May the larvae moulted the first time. Color light, yellowish green longitudinal lines faintly visible.

After the first moult the larva assumes its characteristic markings, and while the mature larvae differ much in the depth of color, they vary none in shape. I had at one time supposed that a larva almost white at maturity, with the longitudinal lines almost obsolete, head red and without the lateral black dash would prove to be some rare species. Unfortunately the larva died when just ready to spin. Other like caterpillars failed to mature, but thanks to Mr. E. A. Dodge, he got a moth from a pupa of this form and it was a plain *piatrix.* Another variety of larva has a rather narrow dorsal-central longitudinal band of pale red or flesh color, contracted and expanded into elongate links. A dark, mid-dorsal line traverses this band. Bordering this dorsal band on either side is a dark brown contracted and expanded band of about the same width as the dorsal band. Below this dorsal lateral band is a much broader flesh colored longitudinal band, and below this a darker band with a longitudinal black line. The prolegs are dark brown on the outside, while the true legs are light flesh color. The whole under surface is pale red or flesh color, with round, black spots. The head is black, except the sides which are pale flesh color. The white larva referred to above had a bright red head without markings.

Another form has the longitudinal lines intensified and differs much from the dark form with the bands and lines practically obsolete.

On the 30th of May I found at the base of a shell-bark hickory tree, under a bit of bark, a large larva of *Catocala residua,*

and a few days later (June 4th) I obtained 17 *Catocala* larvae under the bark of one hickory tree, while Mr. E. A. Dodge and son Ralph got nearly 30. This was a good haul for one tree.

Again, on June 9th, I took 18 larvae on shag bark hickory and on the 12th, 25. These various larvae gave us five species of moths: *obscura, robinsoni, angusi, judith* and *habilis*. The *judiths* were among Mr. Dodge's find. A full-grown larva of *obscura* is light gray, with somewhat lighter tubercles. The longitudinal bands hardly distinguishable. No lateral setae. On the top of the first and second abdominal segments is a black cross line extending downward only over the dorsal and sub-dorsal longitudinal bands. Head light gray, with a short lateral (mouth) dash extending hardly to the middle of the side of the head. Ventral side light gray and with the characteristic round spots, not black as usual, but brown. A broken almost white band extends backward laterally from the first abdominal segment. Feet and prolegs gray. The white lateral band is narrow and just above the spiracles. Larva two and a half inches long. A dark brown, more or less intermittent wavy line separates the lateral band above the spiracles from the broad illy-defined dorsal band. The latter includes the dorso-central and the bounding lateral bands. There is a bristle to each tubercle. No distinct hump. This larva, taken on June 9th, gave an imago of *C. obscura* on July 9th.

A full grown larva of *Catocala habilis* is two and one-quarter inches long, watery or smooth looking, gray, with a reddish tint, more distinctly red along the spiracular band. The mid-dorsal band narrow, lighter than the general color. A narrow black band just above the flesh colored spiracular band. Head grayish, with a red tint and with a broad, black lateral band. A central black spot at the top or back of the head. True and prolegs whitish, with a reddish tint. Ventral side greenish white. The ventral spots smaller than usual in this genus, pale brown. No dorsal hump and no lateral fringe or setae. Sparse, short bristles on indistinct tubercles. This larva is very active, jumping surprisingly.

The last larvae we got on hickory were taken July 4th, though caterpillars of both *habilis* and certainly *robinsoni* could have been found much later.

The larva of *Catocala angusi* is so much like that of *C. habilis* as to be easily mistaken for it. Hardly so red, not so slick looking and with a less distinct or broken stigmatal band. From chrysalids of this species I obtained one normal *angusi* and two small lucettas in early August.

On the 3d of August, Mr. Dodge took a fine *viduata* and a splendid *paulina,* while I took a gigantic *subnata,* species all rare here. On August 4th, Ralph Dodge took a fine *viduata.* On the same day I took my first and only *nebulosa* of the season. On most of our trips Mr. Frank Caldwell accompanied us.

The summer ranked fairly with the past six or seven seasons with no more Catocalae than usual, but we closed the year by securing great numbers of eggs of this beautiful genus of moths.

In trapping for larvae of Catocalae I used the same devices as last year, and added to them shingles which I leaned against the trees. I found that if two shingles slightly separated were leaned together against a bush or shrub the chances of securing a larva between the boards was greater than if a lone shingle was used. Dead twigs are favorite resting places for young larvae.

On mornings after nights of rain I was sure to find larvae, driven down by the water, no doubt.

CORRECTIONS.

In my article, "Notes on the Study of Some Iowa Catocalae" in the January ENTOMOLOGICAL NEWS, occur a few mistakes which I wish to correct.

The fourth word on the twentieth line of the thirteenth page should be *chrysalids* not chrysalis.

The first word on the twenty-fifth line of the same page should be *found* not formed.

On the fifteenth page, thirty-second line, the fourth and fifth words should read *females* instead of two males. This is rather a ludicrous mistake.

The above mistakes might be passed without notice since the reader would readily recognize them as typographical errors, but the next two corrections are of more serious mistakes.

On the seventeenth page the thirty-fourth line should read "The egg of amatrix small, depressed, almost" instead of "The egg of *cara* is small dark brown, with almost white."

For the top line on the eighteenth page substitute "The egg of *Catacola cara,* dark brown with almost white."

ENTOMOLOGICAL NEWS.

[The Conductors of ENTOMOLOGICAL NEWS solicit and will thankfully receive items of news likely to interest its readers from any source. The author's name will be given in each case, for the information of cataloguers and bibliographers.]

To Contributors.—All contributions will be considered and passed upon at our earliest convenience, and, as far as may be, will be published according to date of reception. ENTOMOLOGICAL NEWS has reached a circulation, both in numbers and circumference, as to make it necessary to put "copy" into the hands of the printer, for each number, three weeks before date of issue. This should be remembered in sending special or important matter for a certain issue. Twenty-five "extras," without change in form, will be given free, when they are wanted; and this should be so stated on the MS., along with the number desired. The receipt of all papers will be acknowledged.—ED.

PHILADELPHIA, PA., MARCH, 1909.

A meeting to form a society for the purpose of ascertaining the locality, habits, etc., of insects taken within the United States was held on February 22d, 1859, at the residence of Mr. E. T. Cresson in the City of Philadelphia. This was the beginning of the Entomological Society of Philadelphia which subsequently became the American Entomological Society. The fiftieth anniversary of the formation of this society was recently celebrated. The present set of younger entomologists can hardly appreciate the struggles, trials and tribulations of those that worked fifty years ago. There were very few persons engaged in the study and books on the subject were not many and those that were published were expensive. Money aid was almost unknown and everything was a labor of love. The proceedings of this early society were gotten out by the members, who set the type and did the press work, and all the time given to such work was stolen from their occupations for a livelihood. Some of the younger set are at times a bit critical when they refer to some of the work of the older writers and workers, but this is largely due to the fact that they do not appreciate the difficulties under which their predecessors labored or else the ability to correct a well known author tickles their vanity. Is it possible that the pioneers realized what entomology would grow to, or what it will be in the future? Probably not. They simply studied insects because they had inquiring minds and loved nature.

Notes and News.

ENTOMOLOGICAL GLEANINGS FROM ALL QUARTERS OF THE GLOBE.

THE BOSTON SOCIETY OF NATURAL HISTORY for a number of years has made the New England fauna and flora the leading feature of its museum. The main hall, including the gallery around it, is devoted to the exhibition of New England animals. The mammals and birds are displayed on the main floor. The lower vertebrates and all the invertebrates have been placed in the gallery.

Insects.—Owing to their scientific interest and economic importance, the insects are receiving special attention. On account of the vast number of species and the diminutive size of many of them, only a small proportion has been placed on exhibition. These are in the main gallery, contained in some eighty glass-covered boxes. About 3,000 species are shown, which are representative of all the orders of insects, and illustrate also galls, various kinds of injurious work, life histories, and sundry economic features.

It is estimated that over 11,000 insects have been recorded from New England, and of this number there are more than 5,500 species in the Society's collection. The Curator in charge is our esteemed authority on Diptera, Mr. Charles W. Johnson.

MELITAEA GILLETTEI BARNES.—During the summer of 1906, while collecting in the Coeur d'Alene Mountains of Montana, I was fortunate in obtaining a small series of this rare species, hitherto known only from the type locality, Yellowstone Park, and Idaho. At the time of capturing the specimens I noticed that they were of a species new to me, but being far out in the wilds, I was unprepared to do better than paper my captures. One ♀ which I confined, considerately deposited a batch of eggs in the topsy-turvy way *Melitaes* sometimes have. I could discern no differences between the eggs of *gillettei* and those of *chalcedon* Boisd., both of which I had at the same time. Larvae and chrysalids were also observed on the snow-berry, *Symphoricarpus racemosus Michx.*, a common plant in that region. Five examples of *gillettei* now before me are quite constant, no perceptible variation being displayed, and answer perfectly to the original description of Dr. Barnes. Other specimens are in the collection of Mr. Fordyce Grinnell, Jr., of Pasadena. It is somewhat of a mystery to me how such a distinct and noticeable species as the present one escaped detection for so long, as it is apparently well distributed. Even while on the wing it presents a striking appearance and is not likely to be confused with any of its congeneric forms. Elrod, in his Butterflies of Montana (Bull. Uni. Montana), does not record it, although my specimens were taken only about fifty miles from where his paper was written.—KARL R. COOLIDGE.

The Rev. G. H. Raynor, M. A. in the Entomologists Record and Journal of Variation, Volume xxi, p. 4, 1909, gives the descriptions of twenty-one varieties of the butterfly *Aglais urticae*, and then in addition describes and gives names to thirty more. Of the twenty-one previously known he reduces one to the synonymy, so that we now have fifty named varieties of this single species of butterfly. Mr. Raynor seems to be a specialist on this one species. If he turns his attention to the other butterflies and moths he will put to shame even the editor of the Record as a name mill.

Junonia coenia Hubn. in Maine.—In Ent. News, xix, p. 386, Mr. Wood records the occurrence of this species at York, Me. I would say that during the past eight or nine years I have found stray specimens every season at Fortune's Rocks, near Biddeford Pool, a few miles further north than York. In 1908 I saw only two specimens—a slightly broken one on July 30th and a perfect one August 2nd, both of which were captured. Mr. Lyman has taken the species at Portland some years ago.

At Fortune's Rocks I also took last July two specimens of *Eurema cuterpe*, Men. (*lisa*, Bd.), the first time I have observed it there. A number of other specimens of it were seen early in the month before my arrival.—Albert F. Winn, Westmount, Que.

Notes on New Jersey Orthoptera.—In the Journal of the N. Y. Entomological Society for December, 1908, an *Orchelimum* collected at Tuckerton, N. J., and on Staten Island, N. Y., was described under the name of *O. crusculum*. Mr. Rehn has lately compared some of the Tuckerton specimens with the *Orchelimum fidicinium* from Florida, described by himself and Mr. Hebard in 1907, and finds them to be the same, the characters mentioned for *crusculum*, such as femoral spines, differences in color, etc., not being considered of specific rank.

Another insect recently found by me in New Jersey is the cricket *Miogryllus saussurei*, which occurs in the South, and has also been found in Southern Indiana by Mr. Blatchley. At Lakehurst, N. J., it is found under dead leaves and other objects lying on the ground. My attention was first called to the insect by hearing the males stridulating at night. Their song is a slow *zee*, repeated at intervals of several seconds. Later the females were also found. At Lakehurst and on Staten Island, where I have also collected, several individuals were taken on sandy ground, it reaches maturity in June.

Individuals of this species of cricket differ markedly in the development of the hearing organ on the inner side of the fore tibiae. In two of the examples collected this organ is totally absent, in four it is slightly developed, and in one it is slightly developed on the inner surface of the right tibia, but absent on the same surface of the left leg.

The finding of these insects is only another proof of what is fast becoming an entomological axiom, namely, any species to be found in the eastern United States is likely to inhabit New Jersey.—Wm. T. Davis.

ENTOMOLOGICAL LITERATURE RECEIVED

Specific Characters in the Bee Genus Colletes. By Myron Harmon Swenk. 60 pages and 3 plates.

Sphegoidea of Nebraska. By Harry Scott Smith. 88 pages and one plate.

Both of these papers are contributions from the Department of Entomology of the University of Nebraska.

Bibliography of Canadian Entomology for the year 1907. By Rev. C. J. S. Bethune, D. C. L. Trans. Royal Soc. Canada. Third Series, 1908-1909.

Insect and Fungus Pests of the Orchard and Farm. By Arthur M. Lea, F. E. S., Government Entomologist of Tasmania. Council of Agric., Tasmania, 1908.

Doings of Societies.

A meeting for organizing an entomological society to promote an interest in Entomology and allied subjects in this State was held in the offices of the Providence Forestry Co., Union Trust Co. Building, at Providence, R. I.

By a vote of the nine members present it was decided to call the organization the Rhode Island Entomological Society.

A Constitution was read and adopted, and after this, the election of officers took place, which resulted as follows: *President,* Prescott D. Reynolds; *Vice-President,* Arthur H. Kingsford; *Secretary,* William Place, Jr.; *Treasurer,* H. F. Edy.

After a brief discussion regarding the sight of ants, the meeting adjourned.

WILLIAM PLACE, JR., *Secretary.*

The Brooklyn Entomological Society met Jan. 8, 1909, at 55 Stuyvesant Avenue, with President Pearsall in the chair and thirteen members present.

C. L. Pollard, M.A., curator of the Staten Island Museum was elected an active member.

The election of officers followed. Mr. Pearsall refusing re-election. Prof. John B. Smith was unanimously chosen president; Geo. P. Englehardt, vice-president; Chris. H. Roberts, treasurer for his 31st consecutive term. As Mr. Roberts is

still a comparatively young man we are confident that in time he will surpass the remarkable record now held by the revered treasurer of the Philadelphia Society, Mr. Ezra T. Cresson; R. P. Dow, recording secretary; A. C. Weeks, corresponding secretary, which position he has held for over a quarter of a century; Geo. Franck, curator; Wm. T. Bather, librarian.

It was voted to appoint a committee of five to regulate the valuable library which the society possesses, make a card catalogue, bind wherever necessary and make it of the greatest possible practical use. It was then voted that E. L. Graef, the veteran lepidopterist whose collection including all types, graces the Brooklyn Institute Museum, be elected honorary president of the society.

The personnel of the society has changed much during the past three years. The old guard, who were members when the Bulletin and Entomologica Americana were in their glory, are faithful, but recent elections have been largely young men who are collectors and not necessarily masters of the principles of fundamental entomology. The policy of the society has now been changed to meet present conditions. There is to be an educational keynote running through the future programs, and practical demonstration is to figure.

Under the head of scientific discussion Mr. Englehardt exhibited a collection of mimetic or protectively colored forms which he collected last summer in Guatemala. A series of Syntomidae showed remarkable resemblance to the wasps of the genus *Polybia*. The species of the genus *Ageronia* which rest on tree trunks with wings expanded were fine examples of protective coloration of upper wing surfaces. He showed also a good variety of mimetic *Papilio, Pieris* and *Heliconius* and protected *Caligo, Satyrus, Victorina,* etc.

R. P. Dow, *Recording Secretary.*

A regular meeting of the Entomological Section of the Chicago Academy of Sciences was held Thursday, January 21st, at the John Crear Library. Nine members present.

The Recorder read an announcement of the death of Dr.

Martin Matter, who attended the meetings occasionally. He was spoken of very highly as a sincere friend of nature study. He was best known in the Entomological Section for the interest he took in the study of ants, their habits, etc.

Messrs. Beer and Kwiat exhibited their collections of Limacodidæ. These included the following species taken in the Chicago Area:

Euclea elliottii
" *paenulata*
Adoneta spinulodes
Sisyrosea textula
Lithacodes fasciola
" *var. laticlavia*
Packardia albipunctata
Heterogenea shurtleffii
Prolimacodes scapha
Limacodes biguttata
" *rectilinea var. latomia*
" *Y-inversa*
Tortricidia flexuosa
" *testacea*

There was also another *Tortricidia,* closely resembling *flexuosa,* but much paler, fresh specimens being more of a smooth, cream yellow, as compared with the yellowish brown of *flexuosa.* The primaries also are distinctly wider and shorter with the apex less produced than in *flexuosa.* Both sexes were represented and quite a number of specimens, all having been taken in the sandy region around Hessville, Indiana, where they appear a little later as a rule than *flexuosa.*

Another interesting specimen exhibited by Mr. Kwiat was a *Packardia,* which he is almost convinced is a new species. Nothing like it seems to have been described. In style and marking it is like *albipuncta,* but instead of a whitish ground color on the primaries, this is smooth, yellowish brown, the basal space and outer margin being without clouds or suffusion of any kind, the space between the transverse lines filled solidly with a blackish bue color. The white spots appear as in *albipuncta.* Secondaries black.

Messrs. Healy and Henneberger reported the capture on May 30, 1908, at Glen Ellyn of *Thyris lugubris.* This is a new species for this vicinity.

Mr. Liljeblad exhibited several boxes of Coleoptera just received from Austria. Their excellent condition elicited comment.

Mr. Wolcott exhibited his series of local Haliplidae, the species represented being:

Haliplus triopsis, Say.	*Haliplus ruficollis*, DeG.
" *cribrarius*, Lec.	" *longulus*, Lec.
" *nitens*, Lec.	*Cnemidotus edentulus*, Lec.

He stated that while the number of species equals those recorded in the Ulke list of Washington, D. C., only two *H. triopsis* and *H. ruficollis* are common to the two regions. Mr. Wolcott also exhibited a specimen of *Purpuricenus humeralis* with three tibiæ and tarsi on left fore leg. Also a few rare species including *Nothopus zabroides* and *Ips obtusus*, Say.

ALEX. KWIAT, *Recorder.*

At the meeting of the Feldman Collecting Social, held December 16, 1908, at the residence of Mr. H. W. Wenzel, No. 1523 South Thirteenth Street, Philadelphia, there were fourteen members present.

Mr. Harbeck stated that he had taken specimens of *Eugnoriste occidentalis* Coq. on golden rod, at Trenton, N. J. The localities given for this species in Aldrich's list are Las Cruces, N. M. and Moscow, Idaho.

Mr. H. W. Wenzel reported that he had seen specimens of *Tenodera sinensis* in numbers in many places at Anglesea, N. J. in 1908, from July to September.

Prof. Smith said that he had egg-masses of the same species put out from Orange Mountains to Burlington County, and at not a single place have they established themselves; individual specimens have been found here and there, showing that they have just only maintained themselves. Prof. Smith also spoke of his observations on the flea beetle, *Chaetocnema confinis;* this species hibernates in adult stage, the larvæ and pupæ are found in roots of bindweed, and as soon as foliage appears on sweet potato, the larvæ attack this plant, making channels on leaves, which kill the vines. They disappear by middle of June.

Mr. H. W. Wenzel spoke of collecting many Coleopterous species on different plants than upon those in or on which they

breed, referring particularly to species of *Leptura, Xylene, Lebia,* etc.

Mr. Harbeck said he had recently seen great numbers of *Cicindela dorsalis* on decomposing meat at the seashore. Mr. Harbeck also stated that he had found that by allowing Tipulids to dry before pinning, and relaxing them after they had dried, the legs were not so apt to drop off. Mr. Daecke suggested touching of base of legs with a thin solution of glue to prevent legs dropping off.

Mr. Charles Greene said that he had put two tipulid larvæ in a box, and that one of the larvæ ate the other.

Dr. Skinner spoke of some bag worm larvæ which he collected in the Huachuca Mountains, but which he was not able to raise; they were evidently a new species. Dr. Skinner also referred to a lecture by Dr. F. C. Wellman, the African explorer, in which the lecturer laid stress upon the importance of entomological training, and especially the working out of the metamorphosis of insects, so as to be able to prevent the distribution of disease by the knowledge of their life habits.

FRANK HAIMBACH, *Secretary.*

At the twenty-first annual meeting of the Feldman Collecting Social held January 20, 1909, at the home of Mr. Wenzel, 1523 S. 13th St., Philada., the following members were present: Prof. John B. Smith, Dr. Castle, Messrs. Daecke, Seiss, Laurent, H. W. Wenzel, H. A. Wenzel, Hoyer, Kaeber, Harbeck, Haimbach, Huntingdon, C. T. Greene, Geo. M. Greene and last but not least we enjoyed the presence of our honorary member Mr. James H. B. Bland, the first president of the Feldman, whose visit though unexpected to most of us was most opportune as to-night is the one on which the social becomes of age.

President Daecke in the chair.

The minutes of the previous meeting were read and adopted.

The president read his annual address, which was ordered to be incorporated in the minutes.

The following officers were elected to serve during the year 1909:

H. Harbeck, President; F. Haimbach, Vice-President; H. W. Wenzel, Treasurer; Geo. M. Greene, Secretary; Chas. T. Greene, Asst. Secretary.

Prof. Smith remarked that in importations from France nests of Brown Tail Moth had been introduced into New York and New Jersey, and was more injurious in countries where introduced than its native home. The parasites of this species do not adapt themselves to this country as well as the host. Same speaker said he had heard of a nursery where peonies were so spotted by some insect as to become unsalable so he sent someone to investigate and found blue bottle flies in uncountable numbers. About a quarter mile away was found a field where scrapings from skins of pigs were placed and allowed to decay so the bristles could be used. This entire field of about one-half acre was covered with maggots—the species were of the genera *Calliphora* and *Lucilia*.

Mr. Wenzel stated Mr. Seeber had years ago found a similar field up Second street where he collected many species of *Trox*. Said it would be a great spot for small Silphidae and Nitidulidae.

Mr. Daecke said he had found the collections of the Harrisburgers mostly undetermined but had noticed many interesting Diptera, some species exceedingly common there are rare here. Said he had noticed very good collecting places in the immediate neighborhood.

Mr. Wenzel exhibited specimens of *Colaspoides violaceipennis* collected by H. A. Wenzel and Kaeber in Huachuca Mts., Ariz., in July. This species was described by Dr. Horn from 2 ♀, exact locality unknown but possibly from Southern Arizona. Also exhibited a specimen of *Microdon globosus* Fabr. collected at Castle Rock, vi-13, a species of Diptera rare in this State.

Geo. M. Greene exhibited a longicorn, *Petrognatha gigas* Fabr. from Congo River, and a Buprestid, *Julodus acquinoctialis* Gray, from Sahara Desert.

GEO. M. GREENE, *Secretary.*

FOR SALE

Rare Coleoptera and Lepidoptera from Arizona.—Plusiotis gloriosa, P. lecontei, Polyphylla fuscula, Lucanus mazama, Gloveria gargamelle, G. coronada, Hypherchiria pamina, Eutricha oweni, Thecla ines, Eudamus dorus, Amblyscirtes nanno, Epinephele xicaque—*many others.*

VIRGIL W. OWEN, Clerk's Office, U. S. Courts, Los Angeles, Cal.

MEXICAN BUTTERFLIES AND MOTHS.

Cocoons of Attacus orizaba, Copaxa lavendera, Hyperchiria incarnata, H. budleyi. Fine specimens of Catocala walshii, $1.00 each.

A. A. CHAILLETT, Apartado 2272 Mexico City, Mexico

FOR SALE. In papers, postpaid and perfect: Papilio palamedes, 15c.; Dione vanilla, 5 cts; Catopsilia eubule, 5 cts.; Junonia coenia, 5 cts.

CHAS. FAUST, Magnolia Springs, Alabama

North American Lepidoptera

and inflated larva for sale and exchange. List of the Lepidoptera of Western Pennsylvania, enumerating 1507 species and var., with full data and brief notes, prepaid for $1.25.

HENRY ENGEL, 753 Ensign Avenue, Pittsburg, Pa., U. S. A.

DO YOU KNOW THAT YOUR COLLECTION WILL BE WORTHLESS WITHOUT ACCURATE DATA LABELS?

1000 pin-labels twenty cents. Printed from the smallest type made. About 30 on a strip. No trimming. One cut makes a label. Send money orders. Orders must be in multiples of 500, and no order will be filled for less than 500 each of two labels, or 1000 of one.

C. V. BLACKBURN

32 CHESTNUT STREET, STONEHAM, MASS.

N. B.—Labels are limited to 25 letters; each additional letter 1 cent per thousand extra

Scarce Entomological Literature For Sale.

Before remitting, send us list of those you wish to purchase and you will be advised if they can be supplied, in which case they will be mailed upon receipt of price. *Order by numbers only*, and address American Entomological Society, Publication Department, Logan Square, Philadelphia, Pa.

THIS LIST WILL CHANGE EACH MONTH.

8301. **Bassett**—Description of several new species of *Cynips*, and a new species of *Diastrophus*, Proc., iii, 679-691, 1864 25

8302. **Bland**—Descriptions of several new species of No. American Coleoptera, Proc., iii, 65-72, 1864 15

8604 **Buckley**—Descriptions of new species of N. American Formicidae, Proc., vi, 152-172, 335-350, 1866 67 . . . . . 1.00

91. **Cresson**—On the North American species of the genus *Osmia*. Descriptions of several new species of No. American *Apidae*, Proc., iii, 17-43, 1864 75

8307. **Cresson**—Descriptions of No. American Hymenoptera in the collection of the Entomological Society of Philadelphia, Proc., iii, 131-196, 257-321, 1864 . . . . . 1.50

8314. **Grote**—Descriptions of No. America Lepidoptera No. 3. List of a collection of Lepidoptera Heterocera taken near Williamstown, Mass., Proc., iii, 73-92, 3 col. pls., 1864 60

257. **Hagen and Walsh**—Observations on certain North American Neuroptera by H. Hagen, with notes and descriptions . . . by B. D. Walsh, Proc., ii, 167-272, 1863 1,25

41. **Horn**—On the genera of Carabidae with special reference to the fauna of Boreal America, Tr., ix, 91-196, 8 pls., 1881 . . . . . 1.50

67. **LeConte**—On the affinities of *Hypocephalus*, Tr., v, 209-218, 1876 . . 15

69. **LeConte**—Short studies of North American Coleoptera, No. 1, Tr., viii, 163-218, 1880 . . . . . 1.00

220. **Lintner**—Notes on some of the Diurnal Lepidoptera of the State of New York, with descriptions of their larvae and chrysalides, Proc., iii, 50-64, 1864 30

226. **Packard**—Synopsis of the Bombycidae of the United States, Proc., iii, 97-130, 331-396, 1864 . . . . . 1.50

281. **Shimer**—Description of a new species of *Aleyrodes*. Description of a new species of *Cecidomyia*. On a new genus of Aphidae, Tr., i, 281-285, illus., 1867 10

294. **Walsh**—On the insects, Coleopterous, Hymenopterous and Dipterous, inhabiting galls of certain species of willow. Parts 1 and 2, Proc., iii, 543-644, 1864, vi, 223-288, 1866 . . . . . 2.00

JOURNAL OF ECONOMIC ENTOMOLOGY

Official Organ of the Association of Economic Entomologists

Editor, E. Porter Felt. Albany, N. Y.; State Entomologist, New York
Associate Editor, A. F. Burgess, Wash., D. C.; Sec. Asso. Econ. Ent.
Business Manager, E. Dwight Sanderson, Durham, New Hampshire
Advertising Manager, Wilmon Newell, Baton Rogue, Louisiana

Advisory Board { L. O. Howard, S. A. Forbes, James Fletcher, H. A. Morgan, Herbert Osborn, H. T. Fernald

A bi-monthly journal devoted to the interests of Economic Entomology, publishing the official notices and proceedings of the Association of Economic Entomologists. The best work in Economic Entomology will appear in its pages.

Terms of Subscription:—In the United States, Cuba and Mexico, two dollars annually in advance; to Canada and foreign countries, two dollars and thirty cents annually in advance. Address

JOURNAL OF ECONOMIC ENTOMOLOGY, Durham, New Hampshire

BUTTERFLIES AND MOTHS

FOR SALE, CHEAP—A collection consisting of nearly 3000 named specimens representing an excellent lot of interesting exotics, as well as a good series of North American species, both diurnals and nocturnals.

Fred. M. Mueller, 167 Evanston Ave., Chicago, Ill.

The Butterflies of the West Coast of the U. S.

Plates: 940 Colored Life-Size Photo
Figures, all Named, $1.50 Postpaid.

W. G. Wright, 445 F St., San Benardino, Cal.

EXOTIC LEPIDOPTERA.

ERNEST SWINHOE,

6, Gunterstone Road, West Kensington, London, W.

Cat. No. 17 for 1908 (now ready) mailed free on demand.

The only dealers' list giving authors' names throughout. 100 named specimens, 1 qual: ex Assam, 40 different species in papers, including *Papilio bootes, gyas*, etc., mailed free on receipt of Post Office Order $4.00 Explanatory Catalogue, with over 300 descriptions and many interesting notes 12 cents.

PARCELS SENT ON APPROVAL FOR SELECTION.

When Writing Please Mention "Entomological News."

THE KNY-SCHEERER CO.

Department of Natural Science, G. LAGAI, Ph. D.

404 WEST 27TH STREET, NEW YORK.

ENTOMOLOGICAL SUPPLIES AND SPECIMENS.

The Asta Insect Cabinets.
K.-S. Section Cabinets.
Schmitt Insect Boxes.
K.-S. Lepidoptera Boxes, Coleoptera and Duplicate Boxes
K.-S. Screw Handle and American Nets.
The Asta Insect Pins:
White, 60c. per 1000.
Black, 70c. per 1000.

Catalogue II, Entomological Supplies, on Application.

THE KNY-SCHEERER CO.

DEPARTMENT OF NATURAL SCIENCE.

G. LAGAI, Ph.D., 404 W. 27th Street, New York, N. Y.

PARIS EXPOSITION:
Eight Awards and Medals

PAN-AMERICAN EXPOSITION:
Gold Medal

ST. LOUIS EXPOSITION: Grand Prize and Gold Medal

ENTOMOLOGICAL SUPPLIES AND SPECIMENS

North American and exotic insects of all orders in perfect condition.
Single specimens and collections illustrating mimicry, protective coloration, dimorphism, collections of representatives of the different orders of insects, etc.
Series of specimens illustrating insect life, color variation, etc.
Metamorphoses of insects.
We manufacture all kinds of insect boxes and cases (Schmitt insect boxes Lepidoptera boxes, etc.), cabinets, nets, insects pins, forceps, etc..
Riker specimen mounts at reduced prices.
Catalogues and special circulars free on application.
Rare insects bought and sold.

When Writing Please Mention "Entomological News."

Stockhausen. Printer, 53-55 N. 7th Street, Philadelphia.